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ABSTRACTS

1—FIBRES AND THEIR PRODUCTION

(A)—MINERAL

"Fiberglas": Properties and Applications. J. K. Park. *Amer. Dyes. Rept.*, 1950, **39**, 59-62. The development of the glass fibre industries is reviewed and an account is given of the properties and applications of "Fiberglas". C—**1A.**

(B)—ANIMAL

"Subcutis" and Other Cuticular Preparations from Wool and Hair. E. H. Mercer, J. Lindberg and B. Philip. *Text. Res. J.*, 1949, **19**, 678-685. Brief comments are made on the work of Reumuth and Lehmann regarding the existence of a "subcutis", and its relationship to components of wool and hair fibres as evidenced by electron microscope studies is discussed. The separation of the "epicuticle" from the colourless tubes obtained by Lehmann is described for both wool and hair. It is suggested that the cuticle is divided into three parts, of which the two outer parts may form a tube. There is a comparison with tubular forms obtained by tryptic digestion previously described by Elöd and Zahn. The preparation for electron microscopic examination of material formerly obtained by Geiger is described, and a comparison between the "Lehmann tubes" and the "Geiger sheaths" is made. Several electron micrographs are included. W—**1B.**

Keratin Fibres: Fine Histology. J. Lindberg, E. H. Mercer, B. Philip and N. Gralén. *Text. Res. J.*, 1949, **19**, 673-678. Information concerning the structure of the cuticle and the cortex of keratin fibres has been obtained by means of electron microscopy. The authors suggest a terminology for the cuticle and cortex components. They describe three sub-divisions of the cuticle, and the possible importance of the outermost layer (the "epicuticle") in several aspects of wool technology—dyeing, "wetting" of fibres, felting, shrink-proofing and friction. W—**1B.**

Wool Crimp: Is it merely an "Ornament". W. R. Lang. *Pastoral Review and Graziers' Record*, 1950, **60**, No. 1, 29-30. The author discusses wool crimp from several aspects including its importance to the woolgrower, woolbuyer and manufacturer, and mentions the work and theories of other scientists on keratinisation, effect of water on crimp, compressibility of wool, pliability in manufacture, *etc.* W—**1B.**

Keratin: Formation during Hair Growth. E. H. Mercer. *J. Textile Institute*, 1949, **40**, T640-649. Measurements of birefringence, X-ray examination and special histo-chemical tests carried out on single hair follicles obtained by plucking from the human head lead to the definition of the following zones in the formation of the cortex of the fibre: (*a*) the bulb region: the protein is soft, isotropic, digestible by enzymes and dispersed by urea; (*b*) the fibrillation zone at the constriction of the follicle: the protein becomes birefringent to the same degree as the final hair in a single stage. X-rays show that subsequent to this level the α-keratin structure of the final hair is present; (*c*) the unconsolidated pre-keratinous zone: this zone and the next are characterised by a positive thiol reaction; the structure, although fully oriented, is still unstable. After heating the zone yields a disoriented β-pattern. The zone can be stabilised by the introduction of artificial cross-linking; (*d*) the zone of consolidation: hardening becomes detectable about half-way along the "pre-keratinous region" and is thereafter progressive. Above a fairly definite level the protein only swells in urea, is not digested by enzymes, and is not disoriented at 90° C. Heating to a higher temperature causes disorientation with a contraction in length; (*e*) The fully hardened hair. W—**1B.**

Sheep Parasites in Australia. H. Marsh. *The National Wool Grower*, 1950, **40**, 28-29. Several internal and external sheep parasites including blow-flies, sheep ticks and lice, liver fluke, and intestinal parasites are mentioned, and methods of dealing with them are discussed. W—**IB.**

(C)—VEGETABLE

Cotton: Cultivation in British Guiana; Historical Notes. G. C. Stevenson. *Tropical Agriculture*, 1949, **26**, 67-68, *Internatl. Cotton Bull.*, 1950, **18**, January, 15-18. A brief review is presented of the history of cotton growing in British Guiana since the middle of the eighteenth century, when it was first grown as a plantation crop on an appreciable scale. The early nineteenth century was the time of greatest production. Several attempts at a revival of the industry failed, despite comparative successes achieved in small-scale experiments with hybrid cottons in the beginning of the twentieth century. C—**1C.**

Cotton Insect Pests: Control in Texas, 1948. K. P. Ewing and C. R. Parencia. *Bur. Entomol. & Plant Quarantine*, 1949, E-772, 6 pp. (through *Chem. Abstr.*, 1949, **43**, 7183[a]). A 20 per cent. Toxaphene dust was used for boll weevil and a 10 per cent. dust for the flea hopper. Usually two applications gave seasonal control. The dusted cotton retained its early squares and began fruiting heavily several weeks earlier than the undusted cotton, and reached full maturity at least three weeks earlier. Dusted cotton in boll weevil-infested areas averaged 74 per cent. less punctured squares, 79 per cent. more blooms, and 44 per cent. more yield than the undusted cotton. The average yield from 55 dusted fields was 448 lb. of lint cotton per acre and from 33 undusted fields 310 lb. In the community infested by cotton flea hopper, the average yield of lint cotton was 340 lb. per acre in the dusted and 230 lb. in the undusted cotton. C—**1C.**

Stained and Contaminated Raw Cotton: Sources. ("Stains and Foreign Matter on Cotton.") Bert Johnson. *Textile Industries*, 1949, **113**, No. 12, 87-89, 99. Some of the sources of foreign matter and stains in raw cotton are described. These range from bale ties and bale markings to the machinery in the mill where oil and dirt may be picked up through careless management. A list of 11 sources of trouble is reproduced from educational display matter distributed by the National Cotton Council. C—**1C.**

American Cotton Crop: Control and Marketing. C. D. Walker. *Textile Weekly*, 1950, **45**, 466-470. The writer deals point by point with the working of a scheme of cotton acreage allotment and marketing quotas in the United States. At the latest referendum (1950) 89·5 per cent. of cotton producers voted in favour of the adjustment programme, details of which are given. C—**1C.**

Egyptian Cotton: Statistical Position at 31st August, 1949. R. Dabbous. *Egyptian Cotton Gazette*, 1949, No. 8, 55-69. A statistical survey of the position of Egyptian cotton at the 31st August, 1949, is presented. Figures for the crop, yield per acre, and exports to various countries are compared respectively for the 1947/48 and 1948/49 seasons. The position of each variety is recorded and an estimate of the 1949/50 crop of each is given. (See also *J. Textile Institute*, 1950, **41**, A3.) C—**1C.**

Egyptian Cotton Markets: Organisation. *Egyptian Cotton Gazette*, 1949, No. 8, 35-41. The organisation, administration and operation of the Egyptian cotton markets (Spot and Futures) are described. Some figures for the turnover of a recently re-opened market are presented for the period September, 1948, to May, 1949. C—**1C.**

Flax Varieties: Chemical Study. ("Etude chimique de quelques variétés de lin.") Maurice van Overbeke and Georges Mazingue. *Bull. Institut Textile France*, 1949, No. 13, 23-40. The results are presented of a study in which the authors have investigated: (i) The variation in chemical composition of a dried blade of flax along its entire length; (ii) the influence of age of the plant on its chemical composition; and (iii) the difference in chemical composition of four varieties of flax grown in 1947. The analytical methods used are briefly described. C—**1C.**

Ramie: Processing. G. H. Hoffman. *Textile Weekly*, 1950, **45**, 548. A brief report is given of developments in the decortication and degumming of ramie in Florida. The yield of spinnable fibre is about 50-70 per cent. of the decorticated material. For spinning, worsted or schappe machinery is required, but weaving and dyeing can be done on cotton or linen machinery. C—**1C.**

(D)—ARTIFICIAL

Cellulose Xanthates in Viscose: State of Solution. K. Lauer, O. Wilde and O. Dobberstein. *Kolloid-Z.*, 1949, **112**, 16-20 (through *Brit. Abstr.*, 1949, B II, 1084). Measurement of the heats of dilutions of viscose solutions shows that very dilute solutions (down to 0·08 per cent.) contain molecular aggregates. Primary aggregates originate in native fibres. Solution of the xanthate involves dissociation in the molecular complexes. **C—1D.**

Rotameters: Use in the Viscose Industry. T. G. Hicks. *Rayon & Synthetic Textiles*, 1949, **30**, No. 11, 51-53. The function of a rotameter (a flow measuring instrument in which the indicating device floats in the fluid measured) and its application in the viscose industry are described. A typical flow sheet, showing the locations of the rotameters, is reproduced and discussed. Operation and maintenance of the instruments are briefly considered. **C—1D.**

Polyamides: Preparation and Structure. R. Aelion. *Ann. Chim.*, 1948, [xii], **3**, 5-61 (through Brit. Abstr., 1949, B II, 1105). The kinetics of the polycondensation of 10-aminodecane-1-carboxylic acid (1) are examined in detail and the results are compared with Flory's theoretical calculations. Polymers and copolymers from 9-aminodecane-1-carboxylic acid (2), 10-methylaminodecane-1-carboxylic acid (3), and piperazinium adipate and sebacate have also been prepared. Physical properties, and X-ray and infra-red measurements are recorded and the structures of the polymers are discussed. The polymer from bulk polymerisation of (1) has been melt-spun; the fibre may be cold-drawn about 400 per cent. The polymer of (2) has similar solubility to that of (1), is also soluble in hot ethanol, and may be spun, but contains a higher proportion of low-molecular polymer. The acid (3) also yields polymer with similar solubility to that from (2); it is soft and can be spun to form very weak fibres. **C—1D.**

Vinyl Chloride: Manufacture. F. Kainer. *Kolloid-Z.*, 1949, **113**, 121-128 (through *Res. Assoc. Brit. Rubber Manufs. Summary Curr. Lit.*, 1949, **27**, 927). Methods are described for the manufacture of vinyl chloride: (i) splitting off hydrogen halides, starting from di- or trichloro-ethane or symmetrical ethylene dichloride; (ii) addition of hydrogen chloride to acetylene in the presence of catalysts; (iii) conversion of acetylene with dichloro-ethane; and (iv) chlorination of ethylene or ethane. There are 63 references to German and foreign patents. **C—1D.**

Viscose Rayon Spinning Plant: Decentralised Ventilation. B. V. Shafranov, V. D. Kranifiéld, L. F. Glebova and E. S. Taratuta. *Gigiena i Sanit.*, 1949, No. 6, 27-34 (through *Chem. Abstr.*, 1949, **43**, 8134[h]). Exhaust of carbon disulphide and hydrogen sulphide waste at the individual sites of spinning is effective in voiding the waste matter into the atmosphere when the exit velocity from a roof stack is 15·20 m./sec. in calm weather. Winds above 4 m./sec. lower the effectiveness significantly for personnel at low altitudes. The results are given graphically. Data on the incidence of conjunctivitis are given in respect to effectiveness of such "individualised" blower installations, showing very favourable results if the intakes are directly above the bobbins and the ducts are in line with the natural convection currents at the machines. Significantly higher concentrations of sulphuretted hydrogen are found in the immediately surrounding territory in the summer than in autumn months, but the over-all level is very low (about 1 per cent. of exit concentration) if small-diameter high-velocity exhaust stacks are used, since they promote higher air turbulence and better dilution by the atmosphere. **C—1D.**

Radio-active Tracer Isotopes: Use in the Rayon Industry. P. W. Frisk. *Rayon and Synthetic Textiles*, 1950, **31**, No. 1, 39-41. Some suggested uses of radio-active tracer isotopes in the rayon industry include (1) tracing certain compounds through the entire viscose system, (2) incorporation in an inflammable or poisonous vapour, *e.g.* carbon bisulphide to enable leakage of the vapour to be detected before becoming dangerous, (3) application to the study of the effect of soluble lead salts in the spinning bath, (4) investigation of the clogging of spinnerettes, and (5) the identification of yarns. **C—1D.**

Viscose: Structural Viscosity. ("Viscosité de Structure de la Viscose.") A. Lude. *Rec. Trav. Chim.*, 1949, **68**, 1030-1036. The effects of a number of factors on the structural viscosity of different viscoses have been studied by means of experiments carried out on viscoses subjected to shearing forces

ranging from 10 to 400,000 dynes/cm.^{2} The most important factor studied is the mean chain length and results seem to indicate that the structural viscosity of viscose cannot be treated from the same point of view as thixotropic behaviour. The phenomenon of structure is divided into two parts (1) an uncoiling effect, which is similar to that encountered in dilute solutions and (2) interaction effects peculiar to concentrated solutions. An attempt has been made to obtain values of $(\eta_{sp}/c)_{c\to 0}$ for dilute solutions from results obtained on viscose. For this a modified form[1] of the empirical equation of Philipoff and Hess has been used, and applied to three viscoses of different degrees of pre-ripening. Results are tabulated and shown graphically and are discussed with reference to Kuhn's theories.[2] At very high shearing forces the measured viscosities are roughly proportional to the concentrations, and it is suggested that in this case the interactions between particles have disappeared and that there is a simple summation of the hydrodynamic actions of each of the particles in suspension. ([1]Takei and Erbring, *J. Textile Institute*, 1942, **33**, A531; [2]*e.g. J. Textile Institute*, 1946, **37**, A331.) C—**1D.**

Viscose Yarn: Production. ("Trends in Rayon Yarn Production Methods.") J. L. Costa. *Silk & Rayon*, 1949, **23**, 1129-1132; 1514, 1517; 1950, **24**, 112, 114, 118. The present state of basic methods in viscose rayon production is reviewed. Possibilities for modification are considered under various aspects of quality and costs. In particular, the present state of combined or continuous viscose rayon processing is examined and the several technical and cost factors involved are discussed. Centrifugal and continuous rayon spinning methods are compared, and the conclusion is drawn that until continuous systems have been developed which yield better rayons at lower costs, the modern version of the pot spinning system is less vulnerable from the points of view of investment, quality, cost and dependability. C—**1D.**

Xanthic Acid Thioanhydrides: Transformations. ("Chemistry of Xanthates and Viscose." V.) S. N. Danilov, N. M. Grad and V. O. Klesman. *J. Appl. Chem. U.S.S.R.*, 1949, **22**, 625-633 (through *Chem. Abstr.*, 1949, **43**, 8135^h). Xanthate thioanhydrides do not differ in some reactions from the disulphides; action of alcoholic alkalis or ammonia yields the corresponding xanthates without S evolution. The cellulose derivatives decompose even with aqueous alkali or ammonia; the thioanhydrides are unable to exist in viscose solutions (alkalinity of 7 per cent.). The preparation of cellulose xanthate thioanhydride from sulphite cellulose is described. It is slowly soluble in 20 per cent. NH_4OH, incompletely soluble in 3-5 per cent. NaOH, and soluble in 7-10 per cent. NaOH; although 1 per cent. NaOH has no action, the higher alkali concentrations lead to formation of progressively more soluble xanthates. C—**1D.**

Cellulose Acetate: Structure and Properties. ("The Structure of Textile Fibres X.") D. L. Wilson. *J. Textile Institute*, 1949, **40**, P1070-1076. A popular account is given of the structure of cellulose acetate, its formation by acetylation and hydrolysis of cellulose, and the effect of hydrogen bonding on its properties. Brief reference is made to the dry spinning of cellulose acetate, its fine structure, and the delustering process peculiar to acetate rayon. C—**1D.**

Synthetic Fibres: Manufacture; Progress during 1949. J. A. Somers. *British Rayon & Silk J.*, 1950, **26**, January, 59-60. A brief survey is made of the progress in the manufacture of synthetic fibres during 1949. Developments in dyes for nylon and the search for new polyamides for the production of improved types of nylon filaments are first discussed. New synthetic fibres that are mentioned later include Orlon (polyacrylonitrile), Terylene (a polyester), polymers of *p*-β-hydroxy-ethoxybenzoic acid, Vinyon N, Saran, Velon, and Polythene. There are 41 references to the literature and British and American patents. C—**1D.**

PATENTS

Heterocyclic Ring Linear Polyamides: Production. S. J. Allen and J. G. N. Drewitt (British Celanese Ltd.). B.P.610,304 of 30/9/1942: 14/10/1948. The general claim is for a "process for the production of a linear polyamide containing heterocyclic rings by subjecting to amide-forming conditions, and in the liquid phase, one or more reagents, all the molecules of which, apart from any small proportion of viscosity stabilising constituents, contain two amide-forming

groups and some or all of which contain more than two amide-forming groups, these being present in such positions that from each reagent two can be selected to give a series of complementary pairs which are not in a position to form intramolecularly a 5- or 6-membered amide ring and, having selected these in every possible way and formulated the linear polymer formed by their interaction, the remaining groups are then in positions to form 5- or 6-membered rings". The first example is the polymer

$$[-CH\langle^{NH\cdot CO}_{CO\cdot NH}\rangle CH\cdot(CH_2)_8-]_x$$

obtained by heating $\alpha:\alpha'$-diaminosebacic ester in *m*-cresol. The second has the formula

$$[-N\langle^{CO\cdot CH_2}_{CH_2\cdot CO}\rangle N\cdot(CH_2)_6-]_x$$

and is obtained from hexamethylene diamine *via* hexamethylene bis-imino-acetic acid. Another product is obtained by condensing tri-(β-carboxyethyl)-methylamine with diformylhexamethylene diamine. (See also *J. Textile Institute*, 1950, **41**, A60.) C.

Basic Polyamides: Production. S. J. Allen and G. N. Drewitt (British Celanese Ltd). B.P.610,311 of 28/7/1944: 14/10/1948. This process for the production of polyamides comprises heating a dicarboxylic acid [*e.g.* adipic, suberic, or oxalic acid (in the form of ethyl oxalate)] with a polyamine containing two primary amine groups and at least one secondary amine group [*e.g.* the base $\{CH_2\cdot NH\cdot(CH_2)_x\cdot NH_2\}_2$, where x is more than 3] or a mixture of such a polyamine with a diprimary amine, the NH_2 and CO_2H groups being in equivalent proportions. (See also *J. Textile Institute*, 1950, **41**, A60.) C.

Yarn Pressure-steaming Apparatus. Donald Finlayson and M. W. Alford (British Celanese Ltd.). B.P.623,308 of 28/4/1947: 16/5/1949. The invention relates to the treatment of running yarns with gaseous fluids under pressure, such as for stretching cellulose derivative yarns in wet steam. The apparatus comprises a passage with an entry throat for the fluid supplied under pressure, a divergence in which the fluid can expand and increase in velocity, a convergence in which the fluid can increase in pressure but decrease in velocity, and a further passage for the introduction of the yarn at a point where the above divergence changes to the convergence. Various modifications are shown in nine machine drawings and there are 22 claims. C.

Cyclohexandiol (trans.-Quinitol) Linear Polyester Filaments. J. W. Fisher and James Lincoln (British Celanese Ltd.). B.P.623,309 of 28/4/1947: 16/5/1949. A linear polyester capable of being formed into filaments or films, is obtained by the condensation of trans-quinitol (with a small proportion of another dihydroxy compound, *e.g.* glycol, if desired) and a dicarboxylic acid, *e.g.* succinic acid. C.

Continuous Tow Liquid Treatment Device. R. H. K. Thomson, W. E. Tetlow, A. M. McDonald and Imperial Chemical Industries Ltd. B.P.623,460 of 10/3/1947: 18/5/1949. The object of the invention is to provide a method for the continuous treatment of a travelling tow of filaments or threads when some part of the treatment involves relatively long immersion in a liquid. The liquid is contained in a horizontal ring-trough which is rotated at such a speed that the tow, as it is fed through a reciprocating guide into the trough, forms into folds and remains long enough in the liquid before being withdrawn at another point from the trough. The device is described in connection with the production of a tow of regenerated groundnut globulin filaments. C.

Viscose for Emulsification with Dulling Oils: Preparation. Rayonier Incorporated (assignees of K. R. Gray). B.P.623,566 of 27/7/1946: 19/5/1949 (Conv. 27/11/1945). For emulsifying with a dulling oil it is advantageous to have in the viscose an "unsaponifiable, oil-soluble interfacially-active" material. If the viscose is made from refined wood pulp such an agent may be added to the cellulose or alkali-cellulose before completion of the shredding. A typical addition is a cyclic alcohol having at least 10 C atoms, *e.g.* a sterol; the amount required is 0·02 to 0·05 per cent. on the weight of the dry pulp. C.

Cellulose Ethers: Viscosity Adjustment. Hercules Powder Co. (assignees of E. D. Klug). B.P.623,607 of 23/4/1947: 19/5/1949 (Conv. 24/12/1946). The

etherification of cellulose in an alkaline medium is carried out in the presence of a viscosity-regulating agent such as an alkali-metal hypohalite, peroxide or periodate, or hydrogen peroxide. C.

Tubular Rayon Package Liquid-treatment Apparatus. Oscar Kohorn & Co. Ltd. B.P.623,620 of 7/5/1947: 19/5/1949 (Conv. 26/7/1946). Apparatus for the liquid treatment (*e.g.* washing) of porous tubular packages of rayon and similar thread-like material comprises means for supporting the package and forcing the liquid into it, and sealing means (gaskets) responsive to the pressure for making a fluid-tight seal at one end of the package. The packages may be stacked on counterbalanced, swingable shelves mounted on a movable truck or carriages. There are 22 claims. C.

Terephthalic Acid Glycol Ester: Manufacture. A. C. Farthing and Imperial Chemical Industries Ltd. B.P.623,669 of 9/5/1947: 20/5/1949. The monomeric glycol esters of terephthalic acid are readily obtained in a form easily convertible into the polymeric esters ("Terylene") by forcing ethylene oxide into a mixture of terephthalic acid, water and a small amount of a dissolved terephthalate (*e.g.* the K, Na or pyridine salt) at 95°-100° C. C.

Level-dyeing Artificial Continuous-filament Yarns: Production. British Celanese Ltd. B.P.623,753 of 30/8/1946: 23/5/1949 (Conv. 31/8/1945). Though artificial filament yarns may be constant in dyeing properties along their lengths after extrusion, the fact that they are formed into packages tends to introduce unevenness. It is proposed to overcome this defect by doubling two such yarns together so as to secure a balance of dyeing properties. Thus, one yarn may be taken from the outside of one package and the other from the inside of another package, or one from the shoulder and the other from the middle of two similar packages. C.

2—CONVERSION OF FIBRES INTO FINISHED YARNS

(A)—Preparatory Processes

Cotton: Opening and Cleaning. ("Modern Blowing Room Technique.") N. Pilkington. *Textile Manufacturer*, 1949, **75**, 577-581. The author discusses modern blowing room practices for the production of good, clean, uniform laps. Single-process lappers are examined and the layout of such systems is illustrated diagrammatically. It is shown that good and economical results depend (among other things) on the correct use of air. Rates of working at each stage of the preliminary processing are considered and a graphical method of expressing these is shown. An electrical device for the accurate control of feeds at all stages is mentioned. Recent developments in blow-room equipment are briefly outlined and some general information on beaters is given. **C—2A.**

Carding and Spinning Problems: Discussion. (1) ("Carding and Spinning Probed by Alabama Men.") (2) ("Yarn Manufacturing Practices.") Alabama Textile Operatives Executives. (1) *Textile World*, 1950, **100**, No. 1, 98, 152, 154, 159-160; (2) *Textile Industries*, 1950, **114**, No. 1, 115-116, 119, 121, 123, 125. Written answers by American mills to five questions on carding and six questions on spinning, discussed at the autumn 1949 meeting of Alabama Textile Operating Executives, deal with (i) experience with fringe rollers on scutchers; (ii) licker-in type beaters for cleaning cotton; (iii) one-shot lubrication on scutchers; (iv) changes on scutchers and cards on changing from cotton to rayon; (v) ball-bearing comb-boxes and lickers-in; (vi) continuous strippers; (vii) sleeve-type spindles, (viii) re-winding weft; (ix) spinning frame cleaning methods; (x) anti friction spindles; and (xi) change of ring flange and circle of traveller, *etc.*, when changing to larger rings. **C—2A.**

Drawframes: Maintenance. ("Drawing-Frame Inspection Can Reduce Yarn Variations.") L. A. McComb. *Textile World*, 1950, **100**, No. 1, 103, 174, 177-178, 180. Instructions are outlined for the checking and maintenance of draw-frames. A general survey should be made by dismantling drafting elements in order that causes of yarn variations may be detected and removed. Attention is drawn to trumpet size, clearer cloth and roller wear. **C—2A.**

Coloured Chalks: Application. ("Chalk Marks help Reduce Imperfect Work.") E. H. Helliwell. *Textile World*, 1950, **100**, No. 1, 113-180, 182, 184. Each operative is assigned a colour or combination of two colours with which

to mark his or her work. It is important to choose chalks having fugitive colours which will not affect the yarn or cloth during finishing operations. A set of such chalks has been produced by R. D. Robinson, of the Uxbridge Worsted Corporation, U.S.A. It offers more than 100 colour choices in single or paired marks. The system can be applied, for example, to the identification of roving bobbins or scutcher laps. **C—2A.**

Fine Cotton Spinning Mill: Organisation for Short Processing. T. Ross. *J. Textile Institute*, 1949, **40**, P1061-1069. A report of a lecture and discussion on the possibilities of short processing in fine cotton spinning, under the headings: carding, high-draft flyer frames, clearer winding, gassing and warp beaming. Suggestions are made about machine modifications that seem to be required, and about "training within industry". **C—2A.**

Static Eliminator on Peralta Delivery: Influence on Stock Blending. *Textile Industries*, 1950, **114**, No. 2, 99-100. Static electricity generated by crush rolls rotating under heavy pressure charged individual wool fibres and interfered with proper web formation—the webbing was delivered from the Peralta rollers at the breaker card. The installation of a Chapman static neutraliser resulted in an improvement in stock blending at the intermediate card, a saving in time, and a better quality finished roving. **W—2A.**

Wool Scouring with Synthetic Detergents. J. A. Hepworth. *J. Soc. Dyers & Colourists*, 1950, **66**, 101-108. The essential factors which should be observed when scouring raw wool with synthetic detergents are summarised. The results of the experimental work described indicate that for the most economical scouring with detergents the addition of both soda and electrolyte is necessary. The average concentrations of soda, salt, and alkyl sulphate required in each bowl for scouring merino wool on a large scale are tabulated. Considerable economy is possible if detergents are used for slipe wools. Synthetic detergents may also be used in the woollen trade if the electrolyte is omitted, since, under these conditions, very little grease removal takes place below 2 per cent. Some of the differences encountered when using detergents are mentioned. **W—2A.**

Scotch and Bank Intermediate Feeds: Comparison. J. A. B. Mitchell. *Textile Manufacturer*, 1950, **76**, 19-21. A description is given of woollen carding using the Scotch feed (continuous) and bank feed (intermittent). Comparisons of the two methods were made in a series of tests, and these showed that the yarn from sets with Scotch feed was approximately 7½ per cent. stronger than that produced on those with bank feed. **W—2A.**

Grease Wool: Continuous Dry Cleaning. *American Wool & Cotton Reporter*, 1950, **64**, No. 4, Jan. 26, p. 9, 10, 50. This method advocates the use of a non-volatile naphtha product, "Fialasol," in scouring bowls. The inventor of this substance is collaborating with the inventor of the Hoffman process, which consists of superimposed rollers between which the fibres are continuously moving along while sprayed with solvent under application of a highly efficient scrubbing action. It is stated that this new Hoffman-Fiala process will find applications not only in scouring and depainting mills, but also with fabrics, sheepskins, *etc.* **W—2A.**

Wool: Dry Scouring. *Textile Journal of Australia*, 1949, **24**, 924. An apparatus for scouring greasy wool (Australian Patent No. 132,341) is described. The wool is fed into a hopper where it is opened up by a spiked beater and blown along a pipe into a turbulence chamber together with powdered dehydrated kaolin. The wool and kaolin are then fed into two rotatable chambers. **W—2A.**

Flax and similar fibres: drafting and doubling. Alphomega (Messrs. Fairbairn Lawson Combe Barbour Ltd.). 1949, No. 4, 6-14. The state of the fibres in the carded fleece as it is removed from the doffers of a flax card is discussed, and it is indicated that a draft of less than 2 on the cardhead causes excessive breakdown. The length of the fibre, density of pinning in the gills, disposition of individual fibres, and extent to which the fibres are matted together are the principal factors controlling tension during drafting. Other factors which influence drafting are the distribution of fibres of various lengths throughout the sliver, and the stabilising effect of the gill pins or other control unit on the short fibres. For perfect control in drafting the controlling devices

must fulfil the following requirements: Back rollers should exercise positive control over material fed in and the drawing rollers a similar control over the length delivered: reach should be fractionally greater than the longer fibre: in the drafting zone each fibre must be under individual frictional control. The fulfilling of these conditions in the various types of machines used is discussed. L—**2A.**

New Belgian Flax Tow Scutching Machine. *Linen Trade Circular*, 1950, **36**, No. 1, Jan. 7, 24. During the past 8 months a new type of tow scutching machine, on trial at the Soenens Experimental Station in Courtrai, has scutched 600 tons of raw material very satisfactorily. This machine requires only unskilled labour, and the power required to drive it is 10 h.p. It is stated that fibre ready for carding can be produced from green flax, hemp, jute, and similar fibres, and from green waste of deseeded flax straw, linseed, and retted turbine rough tow rug. Articles manufactured from the tow include braided strings, twines, ropes, cables, sacks (to replace jute sacks), and tarpaulin canvases. L—**2A.**

Flax spinning. Part II—Machinery and equipment. Chapter III—Scutching. (Contd.). A. V. Pringle. *Fibres, Fabrics and Cordage*, 1950, **17**, No. 1, 18-20. The lay-out of turbines and their operation are described, with particular reference to the beaters, change-over of the fibre between two turbines, drives, speeds, and power consumption. The process of tow-cleaning—shaking, rolling, and re-scutching—is dealt with, and also that of baling the fibre and tow, and dust extraction and disposal. L—**2A.**

Decortication of long vegetable fibres. S. A. G. Caldwell. *Text. Rec.*, 1950, **67**, No. 802, Jan., 62-63. The author states that developments in processes and machinery for extracting bast and leaf fibres have resulted in considerable economies in production. The decortication of flax, jute, and coir is usually effected by retting, followed by mechanical or manual treatment to remove unwanted vegetable tissue. This article describes the various methods of retting. Dew-retting is the most economical and is widely used on the Continent. It produces only fibre of limited quality, and requires large areas, preferably pasture land, for spreading the straw. Water retting is carried out in dams, rivers, or tanks. The different factors which affect the efficiency and progress of the ret, and influence the subsequent properties of the fibre, in dam retting of flax are discussed. These may be applied to hemp and jute retting. Tank retting equipment is described, and a diagram given. Coir fibre is retted by steeping the husks in pits in back waters of the sea shore, and along river banks. A form of tank retting, in which the temperature of the water is raised, shortens the time required, but is costly for such a low grade product. L—**2A.**

(B)—Spinning and Doubling

"Whitin" Uptwisters for Artificial Filament Yarns. ("Development of Uptwisters for Filamentous Synthetic Yarns.") R. A. Hargreaves. *Rayon & Synthetic Textiles*, 1949, **30**, No. 11, 63-66. A further illustrated account is given of the development of Whitin uptwisters, with particular reference to the "RF5" machine which is fully described. C—**2B.**

Yardage Controller for Doubling Frames. Thomas Walker and Son Ltd. *Textile Manufacturer*, 1949, **75**, 568. The "Walker" controller, a pre-determining yardage counter for doubling, *etc.* frames consists of a counter with a large clear dial which indicates yardage and embodies an electrical contact mechanism which can be set to stop the motor driving the frame when any desired length of yarn has been run through. C—**2B.**

Nylon Mixture Yarns: Throwing. ("Nylon Combinations are not Hard to Throw.") S. J. Miller. *Textile World*, 1949, **99**, No. 12, 141, 194, 196. Some instructions are given for the throwing of nylon mixture yarns. A feature is the pre-shrinking of the nylon with hot water or steam, or in a regular conditioning box. A list of some new acetate-nylon and viscose-nylon combinations is included. C—**2B.**

Casablancas High Drafting Systems. Walter Andrew. *Textile Mercury & Argus*, 1950, **122**, 355-358, 392-398. The development of Casablancas high-drafting systems is traced, with detailed descriptions of the E10B 2-zone system for ring frames, the 2-zone system for speed frames, the S3 system for long fibre, and the E10A and M48 systems. C—**2B.**

Cotton Spinning Machinery: Trends. W. A. Hunter. *Textile Weekly*, 1950, **45**, 530-538, 594. A report of an address and discussion on the theme that "management and operatives hold the key to quality, whilst machines give production." Trends in the development of machinery for opening and cleaning, carding, drawing, combing, speed frame processes and spinning are reviewed. C—**2B.**

Top Drafting Roller Covers: Maintenance. ("Good Top-Roll Covers Vital to Quality Yarn.") E. H. Helliwell. *Textile World*, 1950, **100**, No. 1, 89, 170, 172, 174. The care of synthetic roller coverings is discussed as an aid to quality yarn production. Systematic checking of roller wear and the setting up of tolerance limits for each type of roller are advocated. Worn rollers are "resurfaced" by buffing to the limits prescribed. The importance of the size of rollers and the prevention of "eyebrows" are also mentioned. C—**2B.**

Ericcson Centralograph: Application in Recording End Breakages. Telephone Rentals Ltd. *Textile Mercury & Argus*, 1950, **122**, 257-261. An illustrated description is given of a Swedish instrument that continuously and automatically records all running and stopping times of a set of machines and also provides means whereby the operator can record the reason for the stop. It could be used, for example, in an investigation of the causes of end breakages in spinning. C—**2B.**

Folded Yarns: Faults; Causes and Correction. F. Bottomley. *Textile Weekly*, 1950, **45**, 474-482. A report of a lecture. Practical hints are given on the causes and correction of defects in (1) preparatory winding, (2) doubling or twisting, (3) clearing, (4) gassing, and (5) package and beam winding. C—**2B.**

Woollen Spinning. *Platt's Bulletin*, Vol. 6, No. 12, 270-274. The modernisation and reorganisation of existing mills leading to higher output is advocated, and reference is made to the plan adopted in a Leeds mill. A study of the conditions resulted in the decision to carry out some structural alterations, and machinery changes included the replacement of the two old type Yorkshire card sets by two modern semi-continental cards, together with the installation of four woollen ring spinning frames to take the place of the three mules. W—**2B.**

Worsted and Blended Yarns: Spinning on Italian Machinery. *Textile World*, 1950, **100**, No. 2, 176, 266, 268. A description is given of equipment produced by four machinery builders in Italy. Mention is made of machinery suitable for the American system of worsted spinning, and photographs of a spinning frame, backwashing machine and continuous wool-scouring machine are included. W—**2B.**

Worsted Drawing Machinery: Developments. ("Uber die Entwicklung der Kammgarnstreckwerke.") O. von Grossman. *Text.-Praxis*, 1950, **5**, 2, 99-101. Developments in worsted drawing machinery during recent years are discussed. W—**2B.**

(D)—YARNS AND CORDS

"Zipknit" Fancy Yarns: Production. ("Novelty Yarns Made on Tricot Machines.") C. W. Bendigo. *Textile World*, 1950, **100**, No. 1, 83-85. A brief illustrated account is given of the preparation and uses of a new novelty yarn which is made on tricot machines. Tricot fabrics are produced (by a patented method) which can be split down to form ribbons. Further development has produced a fabric which can be split down to individual wales. The "yarn" so obtained as known as "Zipknit" and can be used as warp in the production of fancy materials. The splitting is done by a special machine, but the fabric need not be split until it is placed in the loom. The yarn can be used to give terry effects in woven or knitted fabrics. C—**2D.**

PATENTS

High-draft Drawing Head Roving Condensing Device. Jacques Lemaire. B.P.623,366 of 2/5/1945: 17/5/1949 (Conv. 24/6/1941). A device for condensing the roving before it passes through the rollers of a high-draft drawing head comprises two side walls or cheeks, each consisting of a plate that is bent along a line so as to form two triangular portions with an obtuse angle between them. The plates are mounted close to the drawing rollers so that their bottom triangles form a parallel chute and their top triangles converge as the roving passes through. C.

Cord and Rope Forming Machine. Morris Kaplinsky. B.P.623,384 of 19/3/1946: 17/5/1949 (Conv. 28/6/1945). The invention relates to a machine

for forming filaments into cords or ropes, and also knitting wools, on the "rope walk" principle. Spindles are arranged in groups of 3 to 5 around a semi-circular steel arch. A single spindle of each group is driven (by chain and sprocket) in one direction of rotation and the other spindles are driven in the opposite direction. The spindle speeds are variable. C.

Roving Stop-motion for Ring Frames. Eric Cottam and R. B. Cottam. B.P. 623,406 of 31/7/1946: 17/5/1949. The claim is for a roving stop-motion for ring frames whereby, on breakage of the yarn, a severing member controlled by a feeler falls into contact with the roving before it passes between the feed rollers. A centrifugal governor is also provided to put all the feelers out of action if the tension in the yarn is merely temporarily relaxed through reduction of speed. The severing member holds the roving in readiness for piecing up. C.

Ring Frame Automatic Bunching Motion. R. R. A. Hurst, James Hobson and Jack Glover. B.P.623,466 of 8/4/1947: 18/5/1949. A limited oscillation of a gearing-end rocker bracket for forming a bunch on starting to wind a cop is obtained by the differential action of a compound bowl journalled on the bracket and having a chain coupling its larger diameter with the building motion and a chain passing over its smaller part and anchored to a fixed point. When the bunch has been formed the compound bowl is automatically coupled to the rocker bracket by a pawl engaging in ratchet teeth. C.

Spinning Flyer. C. H. Hattersley and Jonathan Hattersley & Son, Ltd. B.P. 623,484 of 1/5/1947: 18/5/1949. A light, strong and easily-threaded flyer is made by forming the legs and transverse top member in one piece by cold pressing, and reinforcing the top member by the attachment of a plate. Details are illustrated in six sheets of machine drawings, and there are 16 claims. C.

Drawframe Hinged Condenser Trumpet. Edward Dawson. B.P.623,520 of 10/5/1947: 18/5/1949. A condenser trumpet for the coiler mechanism of a drawframe and other textile machines is divided vertically into two halves which are hinged together and held closed by a clasp and lug on the respective halves. C.

Drafting Roller Cap Bar Mounting Device. Casablancas High Draft Co. Ltd. and Joseph Noguera. B.P.623,604 of 8/4/1947: 19/5/1949. The invention relates to means of attaching cap bar units to back roller slides so that the units can be removed easily without disturbing the bottom rollers. Each roller supporting slide is adapted on one side to hold the end of a cap bar rod and is formed on the other side with a slot or groove. A cap bar is adapted on one side to hold another rod end and formed on the other side with a slot or groove. The cap bar and slide engage mutually by entering the rod of each into the slot or groove of the other while the slots or grooves lie parallel, and when the rods are aligned angular displacement of the cap bar and slide locks the bar upon the slide. C.

Sliver Can Extension Device. Knowles Ltd. and Maurice Goddard. B.P. 623,799 of 15/5/1947: 23/5/1949. The claim is for a cage-like extension piece whereby the length of a sliver can may be increased so that up to 60 per cent. more sliver may be coiled in the can. The device consists of a lower ring that can slide over the can and an upper ring that rests on the can in its lowest position, the two rings being connected by vertical rods (four are shown in the drawing). A helical spring girdle surrounds the "cage" and grips the can so that the cage will stay in the position to which it is raised. C.

Single-apron Drafting System Saddle Weighting Motion. Howard and Bullough Ltd. and William Wilson. B.P.623,934 of 2/6/1947: 25/5/1949. Roller weighting apparatus for a single-apron drafting system comprises a saddle that is slotted transversely on its upper surface for the reception of the link fulcrum at two or more positions suited to the spacings of the weighted rollers, and has a corresponding series of recesses on its under surface, a lug or projection on the link being arranged to enter one of the recesses or notches according to the slot occupied by the link fulcrum, and the under surface of the saddle being provided with an additional recess for the reception of the lug or projection when the link assembly is raised to be temporarily swung into an inclined position in which the fulcrum of the link on the saddle may be transferred to an alternative slot. C.

3—CONVERSION OF YARNS INTO FABRICS

(A)—Preparatory Processes

Continuous Filament Yarns: Winding Control. ("Quality Winding Demands Precision Control.") K. H. Inderfurth. *Textile World*, 1949, **99**, No. 12, 120-121. The writer indicates some factors to be considered in the precision winding of viscose, acetate and nylon yarns. Density of the package, number of "winds" and tension must all be controlled. These points are discussed and advice is given on the attainment of quality winding. C—**3A**.

"Little Uster" Warp Tying Machines. ("Preparatory Machinery for Synthetic Warps.") G. E. Archer and A. Schuler. *Rayon & Synthetic Textiles*, 1949, **30**, No. 11, 45-46; No. 12, 50-51. Recent developments in the preparation of artificial fibre warps for the loom are considered with particular reference to the "Little Uster" warp tying machines. Advantages arising from tying from an "end and end" lease are discussed, and brief accounts are given of the experiences of several mills with the "Little Uster" machine. There are three models of "Little Uster": Type I, selecting the ends from an unleased sheet of warp, suitable for spun yarns; Type II ties from an end and end lease, used most widely for tying filament warps; and Type III ties a leased sheet of warp to an unleased sheet, and can also be adjusted to tie either as a Type II or a Type I machine. Procedures to ensure peak performance of the Type II "Little Uster" tying machine are briefly described. C—**3A**.

Weft Pirns: Standard Specifications. ("Draft British Standard for Weft Pirns for Direct Spinning of Cotton.") British Standards Institution. *Textile Manufacturer*, 1949, **75**, 584. A tentative standard for weft pirns for the direct spinning of cotton, prepared by the textile machinery section of the British Standards Institution, gives the basic dimensions for the manufacture of weft pirns in wood, light alloys or in plastic materials. C—**3A**.

"Alphatron" Polonium Static Eliminator. ("Radioactive Element 84 Neutralizes Static Charges.") P. M. Platzman. *Textile Industries*, 1949, **113**, No. 12, 90-93. The dissipation of static electricity from textile materials by the use of the Alphatron is described. The device consists of a bar of polished brass or nickel, plated with polonium. Sources of static electricity and its adverse effects in the processing of yarns are described. Some elementary facts about static electricity and alpha radiation are presented. C—**3A**.

Automatic Pirn Winding Machine. George Hattersley & Sons Ltd. *Textile Recorder*, 1950, **67**, January, 73-74. A new British automatic pirn winding machine is briefly described. Six winding heads are mounted on one frame and are driven by an electric motor through pulleys which allow four different spindle speeds between 2,000 and 5,000 r.p.m. Each winding head is driven from the main shaft by means of a friction disc clutch and is self contained, complete with driving gear; bunch building, traverse and automatic changing mechanisms; broken thread stop motion; tensioning and compensating devices, *etc*. The magazine normally contains eight empty pirns; other features include a patent carriage mechanism and a "feeler" wheel which ensures correct build-up. C—**3A**.

Hydraulic Warper. ("Greater Tension Control in Warping.") J. E. Watson. *Rayon and Synthetic Textiles*, 1950, **31**, No. 1, 51. The new Model G high-speed hydraulic warper developed by Wamesit Warper Co., is briefly described. The design of the machine allows density and individual end tensioning control. The density is governed by hydraulic pressure between the yarn beam and pressure roller. This enables beams of identical uniformity to be wound. The machine has variable speed drive and is fully automatic in operation. C—**3A**.

Light Package Uptwister. Ernest Scragg & Sons Ltd. *British Rayon & Silk J.*, 1949, **26**, December, 58-59; *Textile Recorder*, 1950, **67**, February, 72-73. A light package uptwister of new design is described and illustrated. The machine embodies similar mechanical and structural features to those of the Scragg's heavy package uptwister[1]. The scope of the machine can deal with the whole range of silk and artificial fibre yarns, the whole range of twists up to 90 t.p.i., and the whole range of spindle speeds up to 17,000 r.p.m. ([1]*J. Textile Institute*, 1950, **41**, A112.) C—**3A**.

"Mercer" Yarn Tension Meter and Package Density Meter. ("Towards Perfection in Winding.") Universal Winding Co. (Unisel Division). *British Rayon and Silk J.*, 1950, **26**, January, 72. Illustrations are given of (1) the "Mercer" running yarn tension meter, made in two ranges, 0-25 gm. and 0-125 gm., and (2) the "Mercer" yarn package density (hardness) meter, with indicating dial. **C—3A.**

Precision-built Winding Machines. Hobourn Aero Components Ltd. *Textile Recorder*, 1950, **67**, January, 71-72. A precision-built cone winding machine and a twin-spindle bobbin winder are briefly described. The first machine has six self-contained winding heads driven through a common belt by an electric motor. Spindle speeds from 800 to 1,200 r.p.m. are possible. Nylon, rayon, cotton and woollen yarns have been wound on the machine into cones or cheeses. The twin-spindle bobbin and cross-wound package winder is of particular interest to manufacturers of braids. Features of this machine include micrometric adjustment of length of wind, adjustable yarn traverse guides of new design which can be instantly changed to bobbin or package winding, and a new type of electrical yarn knock-off control. Spindle speeds are 2,010 r.p.m. for bobbin winding and 600 r.p.m. for cross-wound package winding. **C—3A.**

Tyre Cord Up- and Down-Twister. ("2-for-1 Twister is Upstroke and Down-Stroke.") Howe Machinery Co. *Textile World*, 1950, **100**, No. 1, 123. A new 2-for-1 twisting machine for the production of tyre cord which does up-twisting, plying, and down-twisting, consists of three units, two 2-for-1 up-twisting spindles running at 7,200 r.p.m., and a down-twisting spindle for plying or cabling which runs at speeds up to 7,200 r.p.m. The up-twisting spindles operate in a manner similar to those on 2-for-1 twisters with automatic tension control, but the 2-for-1 down-twister is unique in its operation. The package accommodates 10 lb. and is driven by means of a magnetic clutch. All three units are driven by a common flat belt. **C—3A.**

(B)—Sizing

American Cotton Mills: Sizing Practices. ("Slashing Practices Discussed by Georgia Men.") Georgia Textile Operating Executives. *Textile World*, 1949, **99**, No. 12, 117-118; *Textile Industries*, 1949, **113**, No. 12, 123-129. Answers to some questions on sizing which had been submitted to Georgia mills are presented. The topics reported include the use of size viscometers, the covering of squeeze-rollers, hot-air slashers, steam controls, warp splitting, "run-outs", and the driving of creels. **C—3B.**

American Ribbon Factory Automatic Sizing, Bleaching and Dyeing Controls. ("Automatic Controls Lower Costs, Raise Quality.") E. D. White. *Textile World*, 1949, **99**, No. 12, 133, 135, 192, 194. Automatic controls, for wet processing, used by American ribbon manufacturers are briefly described. Uniformly sized yarn is produced on an almost automatic slasher, the temperature of each cylinder of which is controlled to 2° F. as is the temperature of the size solution. By means of a Moist-O-Graph moisture regain is controlled to 0·25 per cent. The level of the size in the size box is maintained constant within half an inch and size viscosity is also controlled. Controls for other processes include control of temperature for bleaching and dyeing operations, automatic control for calendering, and also for the boilers which provide steam. Some photographs show these controls in operation. **C—3B.**

Fugitive Tints for Nylon Yarns. E. I. du Pont de Nemours, Nylon Div. *Rayon & Synthetic Textiles*, 1949, **30**, No. 11, 66-67. A list of dyes is given which have been found satisfactory as fugitive tints for nylon hosiery yarns. Suggestions for the removal of these colours and the scouring formula used in the tests are given. Not all tints suitable for hosiery yarns were satisfactory for nylon weaving yarns; dyes that were satisfactory when a described acid-Textone treatment was used for their removal are listed. **C—3B.**

Rayon Warp: Sizing. ("How a Certain Warp Sizing Trouble was Solved.") J. J. Sussmuth. *Rayon & Synthetic Textiles*, 1949, **30**, No. 11, 54. If one warp weaves differently from the others of a set, although conditions were apparently identical, the whole cycle of operations from warping, through sizing and finally the set-up in the loom should be investigated. An actual case is described to illustrate the manner in which such investigation can lead to good results. **C—3B.**

Starch Pastes containing Fat: Characteristics. ("Studies on the Application of Starch in Textile Processes." Part I.) Jens Jensen. *Contrib. Danish Inst. Textile Res.*, 1949, No. 8, 3-15. The effects of the mode of preparation and time of boiling of emulsions of starch paste and fat on the properties of derived starch films have been investigated. Starch pastes were prepared (at 80° and 99° C.) and tallow dyed with Sudan Red was added under various conditions. After different periods of boiling and stirring, samples of the mixture were removed and films were cast and examined under the microscope. The dyed tallow is clearly discernable. Starch films containing fat were also subjected to mechanical tests and stressed to breaking either by stretching or by continuous bending and rubbing. Photomicrographs are reproduced which show the effects of added surface-active agent and of alkalinity, the appearance of the emulsions after successively longer periods of processing, and also the ruptures in starch films of varied age caused by mechanical actions. Experimental procedures are described. The results show that the properties of a fat emulsion in a starch paste depend on the details of preparation and duration and conditions of preservation, and that the emulsion may continue to undergo changes for several hours after the preparation of the paste. **C—3B.**

Starch Pastes: Adhesiveness. ("Studies on the Application of Starch in Textile Processes." Part II.) Jens Jensen. *Contrib. Danish Inst. Textile Res.*, 1949, No. 9, 3-16. The influence of certain admixtures on the properties of starch paste have been studied, especially in relation to the adhesiveness of the paste and its application as a sizing and finishing agent. Strips of filter paper were treated with starch pastes of different characteristics, some containing surface-active substances. After conditioning and drying, the paper strips were subjected to continuous mechanical stresses until breakage occurred, the number of stresses applied being taken as a measure of adhesiveness. Details are given of the preparation of the starch pastes, the determination of their viscosities, impregnation and conditioning of the paper strips and the mechanical testing. The apparatus is described and illustrated. The influence of an anionic and non-ionic commercial surface-active agent on the adhesiveness and viscosity of pure starch pastes and pastes containing fats or glycerol as softeners are discussed. Most of the work has been done on farina starch, but some results are also given for wheat starch. **C—3B.**

"Tyze" and "Elvenol" Sizes for Nylon: Application. ("Raw Nylon Sizing is Critical Operation.") E. I. du Pont de Nemours & Co. *Textile World*, 1950, **100**, No. 1, 93, 164, 166. The use of two du Pont sizes, Tyze (acidic) and Elvanol (non-acidic) for nylon is briefly described. Some suggestions for the successful sizing of raw nylon are given. **C—3B.**

Votator Size Cooking Apparatus. ("Votator Offers Slasher Savings.") Girdler Corporation. *Textile Industries*, 1950, **114**, No. 1, 74-76. In a new process for the preparation of size, the ingredients are mixed in the cold, stirring being accomplished by means of a circulating pump, and the cold slurry then passes to the "Votator" unit where cooking and stirring occur. The Votator consists of a heated cylinder containing rotating blades and the size mixture passes through this unit continuously enabling 2,000 gallons of size to be treated in an 8-hour day. The action of the Votator is explained and illustrations of the system are shown. **C—3B.**

Warp Size Homogenizer. Tri-Homo Corporation. *Textile Industries*, 1950, **114**, No. 1, 161. The Tri-Homo Homogenizer and Disperser for mechanically breaking down starch solutions is briefly described and illustrated. During their passage through the machine the starch particles are given three grindings simultaneously, between the faces of a rapidly turning three-angle rotor and stator. Machines vary in capacity from 600 to 1,500 gallons per hour. **C—3B.**

Ribbon Warps: Sizing. ("Cotton System Slashing Pays in Ribbon Mill.") E. D. White. *Textile World*, 1950, **100**, No. 1, 117-119. An American ribbon mill has changed from the silk to the cotton method of sizing. A brief illustrated description is given of the plant employed. Features of the 7-cylinder slasher include a Brown Moist-O-Graph for controlling the speed of the machine, fluorescent tubes providing high-intensity illumination on the warps, individual temperature control of each cylinder to within 2 per cent., constant level and temperature control of the size box, and a stainless-steel hood with vent for the cylinders. **C—3B.**

(C)—WEAVING

Aluminium Alloy Loom Sleys. ("Pepperell Experiments with Aluminium-Alloy Lays.") Earle Mauldin. *Textile World*, 1949, **99**, No. 12, 119. Experiments carried out by an American mill on the use of aluminium alloy sleys showed that shuttles running with these metal sleys lasted four times as long as they did in comparable tests with wooden sleys. The alloy sleys have a specially designed cross section, giving great dimensional stability. C—**3C.**

"Handler" Weft Feeler Stop-motion. Handler Loom Ltd. *Textile Manufacturer*, 1949, **75**, 564. A brief description is given of the "Handler" weft feeler stop-motion. A spring-actuated gate in the side wall of the shuttle is held open until only enough weft for four or five picks is left on the bunch of the pirn. Then it becomes automatically locked and engages the feeler rod and so actuates the stopping mechanism. Some advantages of its use are enumerated. C—**3C.**

Loom Circular and Skip-box Motions. W. Middlebrook. *Textile Manufacturer*, 1949, **75**, 571-573. Continuing his series of articles on loom box-changing motions, the author gives an illustrated technical description of circular and skip-box motions. The skip box motion makes it possible to bring into play any one of the six shuttles in a revolving box loom. C—**3C.**

American Cotton Mills: Weaving and Management Problems. ("Mill Men Discuss Practical Problems.") Southern Textile Association (U.S.A.). *Textile World*, 1949, **99**, No. 12, 137, 139. A brief report is presented of topics concerning mill operation which were discussed at a meeting of the Southern Textile Association (U.S.A.). The 27 questions and answers deal with carding, spinning, weaving and maintenance, and include re-working of waste, proper humidity, weaving techniques and other operations. C—**3C.**

American Textile Mills: Weaving Practices. (1) ("Georgia Weavers Compare Operating Data.") (2) ("Georgia Operating Executives Describe Weave Room Techniques.") Georgia Textile Operating Executives. (1) *Textile World*, 1949, **99**, No. 12, 122-123, 208; (2) *Textile Industries*, 1950, **114**, No. 1, 127-134. Answers to some questions on weaving practices which had been submitted to 20 Georgia mills are presented. The topics dealt with include shuttle bristle and fur, cloth quality and its control, weft conditioning, pinion and friction drives, and the sizes of pirns in relation to weft break. A table showing the life and cost of loom parts and a list of 27 causes of cloth defects are also included. C—**3C.**

Statistical Aids in the Weaving Sheds. I. Laird. *Textile Manufacturer*, 1949, **75**, 526-528; 562-564. In continuation of his series on P.M.H. in weaving[1], the author describes some applications of simple statistical methods to weaving shed management. The use of graphs and charts is discussed and their advantages and disadvantages are considered. "Pie" charts, cycle-wheel charts and triangular pictorial charts illustrating waste percentage, absenteeism and percentage of seconds are shown and explained. Trilinear charts, pictograms and simple and compound bar graphs are also described and illustrated. ([1]*J. Textile Institute*, 1949, **40**, A282.) C—**3C.**

Automatic Pirn-changing Loom. Harling and Todd Ltd. *Textile Recorder*, 1950, **67**, January, 68-70. An illustrated account is given of a new loom fitted with the Fischer automatic pirn-changing motion and shuttle checking device which ensures correct pirn changes. Other features of the loom include the steel sley, the automatic warp let-off, the cloth take-up motion (Pickles straight type), the automatic warp and weft stop motions, and the loom drive. The loom is suitable for weaving most types of the plainer fabrics. It has a 48-inch reed space and runs at 201 picks per minute. C—**3C.**

Gripper Loom. Boucher & Co. Ltd. *Textile Mercury & Argus*, 1950, **122**, 360-361. A brief account is given of a new gripper loom for carpets having (1) a negative 10-colour jacquard, (2) a multi-blade knife motion working below the grippers, (3) yarn carriers backed by hardened steel rollers, (4) an arrangement of four heald cams providing for four different weaves, and (5) accommodation for three 24-inch beams that can be rolled into position along permanent channels. C—**3C.**

"Hattersley" Rayon and Silk Loom. George Hattersley & Sons Ltd. *British Rayon & Silk J.*, 1949, **26**, December, 56, 57; Stepen Major. *Textile*

Recorder, 1950, **67**, January, 66-67. A new fully-automatic silk and rayon loom is described and illustrated. It is a precision built shuttle-changing loom with two shuttle magazines and a 2-cell weft mixing motion. The following features are described: Automatic shuttle-change motion, the 2-box weft mixing motion, special cam dobby shedding, centre weft fork and loom reversing motions, automatic warp let-off motion, cloth take-up motion and automatic warp stop motion. The loom has a reed space of 57 inches and a running speed of 155 picks per minute. C—**3C.**

Large Weft Package Rayon Loom. Butterworth and Dickinson Ltd. *British Rayon & Silk J.*, 1950, **26**, January, 66-67; *Textile Recorder*, 1950, **67**, February, 74-75. The claims put forward for the large package system as against automatic weft replenishment are discussed, and a new large weft package rayon loom is briefly described. This loom is fitted with a 2-shuttle drop-box motion, and with two shuttles working alternately every two picks and, with the loom running at 140 picks per minute, the loom will operate without weft replenishment for 1¾ hours. Special features include a large "silk" sley with large-capacity shuttle boxes and the quick-acting patent centre weft-fork motion. C—**3C.**

Picking Motion Lug Straps: Construction. H. E. Wenrich. *Rayon and Synthetic Textiles*, 1950, **31**, No. 1, 44-46. Tests have been carried out on four different lug straps of rubber and canvas construction and also of hickory. For high-speed looms hickory lug straps are unsatisfactory, though excellent for slower looms. The rubber-canvas straps show varying degrees of superiority over hickory and their performances are examined in the report. C—**3C.**

Selvedge Trimming and Strap Cutting Machines. L. G. Davis. *Textile Recorder* 1950, **67**, January, 61. Three new pieces of textile equipment introduced by the Ginsberg Machine Co. Inc., New York, are briefly described. (1) An automatic strap cutter cuts and counts straps and ribbons to any desired length between 4 and 30 inches. (2) The suction thread trimmer (known as the "Trim-Master") trims loose selvedge ends, the cut pieces of thread being removed by suction. (3) The "Individual Trim-Master" is similar but has been developed for smaller work or work in confined spaces. C—**3C.**

"Tattersall" Loom Beam Weighting Motion. Coventry Welding Service. *Textile Weekly*, 1950, **45**, 550-552. A brief illustrated description is given of a weighting motion that can be bolted to the bottom rail on both sides of the loom and connected by means of a foot-lever and spring to the rope or chain that passes round the ruffle. Passing through the slotted foot-lever is a steel plate drilled in the form of a "Jacob's ladder", to which are attached two steel pins by means of small chains. When the tension is adjusted one pin is placed in the hole immediately above the foot-lever, which holds the tension as long as required. When "letting-off" the second pin is placed in the nearest hole, the lever is depressed and the lower pin is withdrawn. The lever is thus brought up to the pin and the tension is reduced a little. The operation is repeated and the lever climbs the "ladder" until the beam is empty. An illustration shows how the motion may be used to govern two beams, as in leno weaving. C—**3C.**

Model X-2 Loom Lubrication Charts. Draper Corporation. *Textile Industries*, 1950, **114**, No. 1, 69-72. A series of three charts has been made available, on which lubrication points, intervals of lubrication and methods of lubrication are shown in colour. The information refers particularly to Draper Model X-2 looms but can serve as a basis for charts for other models. Small reproductions of the charts are presented. The charts are made for three systems of lubrication: (i) the grease gun, (ii) grease applied with brush, and (iii) oil delivered by oil can. C—**3C.**

Cotton Fabrics: Width and Length Contraction in Weaving. J. H. Strong. *Textile Mercury & Argus*, 1950, **122**, 270-275. The writer gives, with examples, six rules (including those of Brooks and Walmsley) for calculating the allowance to be made for width contraction in weaving and eight rules for length contraction. Their limitations are discussed. C—**3C.**

Rayon: Weaving in the United States. British Rayon Federation. *Textile Manufacturer*, 1950, **76**, 3-6, 40. The report of the Rayon Weaving Industry Team, which visited the U.S.A. under the Anglo-American Productivity

Council scheme, is presented under the headings warping, sizing, pirning, winding, drawing in, twisting and knitting, weaving, types of machinery, work load with automatic and non-automatic looms, methods of work of weavers and overlookers, methods of payment, mechanical aids, cloth examination, labour, productivity per man-hour, and time and motion study. It is reported that rayon weaving in America follows the same general pattern as in Britain, but there are many practices in America, which if adopted here, would improve the productivity of British rayon mills. C—**3C.**

Weaving Sheds: Organisation; Simple Statistical Aids. I. Laird. *Textile Manufacturer*, 1950, **76**, 10-14. Continuing his series[1] on the use of charts and graphs as simple statistical aids in the weaving shed, the writer deals with natural, scale or arithmetic line graphs. Such graphs are described and illustrated for production, wages' range, labour turnover, static-type line graphs (*e.g.* yards per pick per efficiency graphs), equivalent reed-sets, metric equivalents (*e.g.* for conversion of yd., lb., sq. yd., *etc.*, to metric units), equivalent yarn count, and hourly loom production. Instructions for the preparation of these graphs are given. ([1]*J. Textile Institute*, 1950, **41**, A186.) C—**3C.**

Carpet Weaving: Preparation. A. Crossland. *Textile Manufacturer*, 1950, **76**, 22-27. The importance of the preparatory steps is stressed, and the survey of several processes includes starching, tinting and beaming of stuffer and chain warps, cheese winding of pile yarn, pile warp winding, cop winding, *etc.* Several diagrams and photographs are included. W—**3C.**

(D)—KNITTING

Spun Nylon Yarns: Use in Hosiery. ("Nylon Staple in Half Hose.") D. H. Heckert. *Rayon & Synthetic Textiles*, 1949, **30**, No. 12, 72-74. The preparation and properties of nylon staple are reviewed and the favourable wear characteristics of spun nylon socks are pointed out. Studies on the "pilling" (matting of surface fibres due to washing and abrasion) of spun nylon articles are reported and the use of significantly higher twists is recommended as a cure for pilling. The use of crimp-set staple improves loft and coverage of spun nylon yarns and also the insulating value. The pre-boarding of crimp-set half hose is discussed. C—**3D.**

Looping and Seaming Machines: Operation and Maintenance. S. H. Boyer. *Textile Industries*, 1949, **113**, No. 9, 135-143; No. 11, 136, 141-146; No. 12, 143-153; 1950, **114**, No. 1, 139-144, 147. This series of illustrated articles is devoted to looping and seaming machines used in the full-fashioned hosiery industry. The Sotco steady dial looper is discussed in detail and its dismantling and re-assembly are covered thoroughly. The Union Special Class 41300 hosiery seamer and its operation are fully described and illustrated. Finally, a description is given of the Singer 242-1 hosiery seamer, its operation and maintenance. C—**3D.**

Knitting Machinery: Visual Warning Indicators. ("Annunciator System Saves Time.") Textron Tricot Division, Willimantic, Connecticut. *Textile Industries*, 1949, **113**, No. 12, 94. A brief account is given of an annunciator system which has been fitted to knitting machines. Green and red indicator lights are fitted to each machine and give warning when attention is required. C—**3D.**

Multi-design Ribber. ("Ribber Features Improved Pattern Unit and Wrap Yarn Supply.") Fidelity Machine Co. Inc. *Textile Industries*, 1950, **114**, No. 1, 138. A new "Hi-Speed Fidelity Multi-design Ribber", the Model S-49 is announced. Eight advantages claimed for the machine are listed and include an improved pattern unit and improved wrap yarn supply. C—**3D.**

Pressed-rivet and Screw-rivet Knitting Machine Needles: Comparison. *Textile World*, 1950, **100**, No. 1, 115, 166, 168. Tests have been carried out on half-hose machines using pressed-rivet and screw-rivet needles. The difference between these needles is described and shown diagramatically. More screw-rivet needles had to be removed because of bent latches than those of the other type. C—**3D.**

Fully Fashioned Hosiery: Construction. ("Spotlight on Fully Fashioned Hosiery.") J. B. Lancashire. *British Rayon & Silk J.*, 1949, **26**, December, 40-41, 45. The knitting of various current designs in fully fashioned hosiery

is discussed. The relative merits of separate "legger" and "footer" frames and of the "Single Unit" type of machine are briefly considered. The knitting of the diamond point toe, the hockey stick toe, the tab heel, and modern "round" heels (the Berkshire heel) is described and some mention is made of welt-turning. C—**3D.**

(E)—LACEMAKING AND EMBROIDERING

Smallwares: Braiding. A. Thompson and Sigfrid Bick. *British Rayon & Silk J.*, 1950, **26**, January, 54-58. The principles of braiding are indicated and various braiding machines are considered. The "Barmer dolly" is described in some detail and its action is explained. The latest developments in braiding machinery are briefly reviewed and illustrated. Various types and designs of braids are mentioned and photographs of several of these are shown. C—**3E.**

(F)—SUBSEQUENT PROCESSES

Nylon Fabrics: Sewing. ("Sewing Woven Fabrics.") E. I. du Pont de Nemours, Nylon Division. *Fibres*, 1949, **10**, 444-445; *Rayon and Synthetic Textiles*, 1950, **31**, No. 2, 70-71. Nylon woven goods have a tendency to pucker at the seams instead of lying flat and practical advice is given on how this may be reduced. Best results are obtained when the majority of seams are sewn weft-way or on the bias and when a single-needle machine is used for stitching. Low thread tensions must be maintained during sewing, and fine nylon thread and fine needles should be used. C—**3F.**

"Orlon": Application in the Canvas Goods Industry. J. B. Quig. *Rayon and Synthetic Textiles*, 1950, **31**, No. 1, 64-65. Because of its high resistance to sunlight, smoke, soot, acid fumes and rotting, Orlon is recommended as sewing thread in the canvas goods industry and as awning material. C—**3F.**

(G)—FABRICS

"Supatex" Non-woven Textile Fabrics. A. Kershaw. *Textile Manufacturer*, 1949, **75**, 559-560. A brief review is presented of the properties and uses of "Supatex" fabrics, which consist of a web of fibres (cotton, cotton/rayon, or all rayon) bonded by means of such agents as rubber latex, viscose, protein glues, synthetic resins, *etc.* They are claimed to be true textile fabrics with designed construction. Applications of non-woven fabrics, mainly as replacement of the industrial type of woven textiles are briefly dealt with. C—**3G.**

Crêpes: Manufacture and Construction. Irving Teplitz. *Textile Manufacturer*, 1950, **76**, 7-8. A brief review is given of the manufacture and construction of crêpes under the headings yarn denier, yarn twist, the different yarn constructions in use, ply yarns, throwing, the weaving of crêpes, determination of the cost of the yarn, and dyeing and finishing. Factors affecting the texture and face of crêpes are summarised. C—**3G.**

PATENTS

Jacquard Balancing Mechanism. A. H. Labbe. B.P.623,095 of 23/10/1946: 12/5/1949 (Conv. 25/3/1946). The claim is for balancing mechanism for jacquards in which the weight of a griffe frame is balanced at each shed by a force independent of but collaborating with the loom driving motor, the force being varied proportionately to the weight to be lifted by the movement of a balance beam interposed between the driving motor and the mechanism to be raised. C.

Loom Underpick Motions. James Blackburn and H. H. Mallott. B.P.623,092 of 30/12/1946: 12/5/1949. The invention relates to a relatively silent and vibrationless underpick motion, comprising a cam shaft coaxial with the pivot shaft of the sley and chain-driven from the heald shaft, and a cam at each end of the cam shaft upon which rides a roller carried by a rocker arm and held against the cam by a spring. The rocker arm is connected to the picker by an extension arm and an adjustable link. The sley thus moves backwards in the opposite direction to the motion of the cam shaft at the moment when the cam is acting on the rocker arm to propel the picker, so that the picking motion is accelerated. The picking arm carries a spring-loaded roller that rides on a path or track so that the operative end of the picker moves in a horizontal path. An adjustable long-blade buffer spring connected by a strap to the picking arm serves to cushion the movement of this arm as it nears the end of its stroke. C.

Carpet Loom Creel. H. J. Austin and F. L. Mack. B.P.623,371 of 25/7/1945: 17/5/1949. A creel for Wilton carpet looms comprises one or more stands for bobbin-carrying frames each of which has at one or each end at least one yarn-spacing rail for feeding the yarn from the bobbins to the loom. C.

Automatic Non-laddering Warp Knitting Machine. Thomas Haimes & Co. Ltd., Clarence Bell, G. D. Walker and R. M. Walker. B.P.623,372 of 15/9/1945: 17/5/1949. The invention relates to an attachment to warp knitting machines whereby a wide width and length of fabric can be knitted with the necessary reinforcements for heel, foot and toe automatically formed in their appropriate places. An auxiliary or sub-divided guide bar is used. Details are shown in eight sheets of machine drawings. C.

Straight-bar Knitting Machine Stop Motion. I. L. Berridge & Co. Ltd., C. S. Martin, L. H. Colton and A. E. Cooke. B.P.623,376 of 15/11/1945: 17/5/1949. The invention relates to means for preventing the needles from pressing when a fault is detected on a machine of Cotton's patent type. The device consists of two elements that pass each other in each knitting cycle but engage each other on detection of a fault and cause the hand and press levers to be disengaged. C.

High-speed Warp Knitting Machine. S. G. Dehn (for Vanity Fair Mills Inc.). B.P.623,403 of 8/7/1946: 17/5/1949. The invention relates to knitting machines of the tricot or warp type and the objects include (1) speeds of 900 r.p.m. or more, (2) minimum vibration, (3) almost infinite patterning possibilities, (4) dispensing with the use of spring-bearded or latch needles and longitudinally sliding tongues, (5) minimum use of cams, (6) continuous movement of the needles, tongues and sinkers without substantial periods of dwell, (7) mounting the needle, tongue and sinker bars on a single rock shaft, (8) the use of non-swinging thread guides, and (9) the use of eccentrics, adjustable levers and connecting rods to actuate the rock shaft, needle bar and sinker bar. Two embodiments of the invention are described in detail, with the help of 19 sheets of machine drawings. The machine is particularly adapted for fitting with the tongue-type needles covered by B.P.601,020 (*J. Textile Institute*, 1948, **39**, A528.) C.

Knitting Machine Splicing Mechanism. Mellor Bromley & Co. Ltd. and Arthur Shortland. B.P.623,480 of 1/5/1947: 18/5/1949. The invention relates to mechanism for introducing a splicing thread to, and to withdraw it from, the first and last needles of a group comprising half of the needles of a circular series, at successive courses of knitting, for the purpose of producing half-round or similar splicing effects, *e.g.* a reinforced high splice above a heel or a reinforced foot bottom. C.

Shuttle Tong. Thomas Dawson (Shuttlemakers) Ltd. and John Dawson. B.P.623,493 of 3/5/1947: 18/5/1949. Means for determining the position of a weft package on the tong of a shuttle comprise a washer, formed with projecting lugs, brazed or welded to the blade of the tong so that the lugs engage recesses, slots or notches in the base of the weft carrier and hold it in the correct position relative to the weft feeler motion. C.

Circular Knitting Machine Stitch Length Adjusting Device. B. T. R. Reymes-Cole (=B. T. Cole). B.P.623,540 of 20/3/1945 and 25/5/1945: 19/5/1949. A device for adjusting the stitch length by altering the relative height of the needle cylinder and stitch cam, and having at the front of the machine a main racking drum shaft carrying an independently-racked graduating cam for adjusting the stitch length down the leg, is characterised by slack-course cam and follower mechanism adjustable by means of a screw. C.

Shuttle Drags. Les Fils de Guillaume Diederichs. B.P.623,553 of 2/5/1946: 19/5/1949 (Conv. 7/4/1939); also B.P.623,554 of 7/5/1946: 19/5/1949 (Conv. 21/5/1942). (1) A drag for the weft in a shuttle has two cushions of sheepskin or the like, the bottom one mounted on a pivoted plate that can be rocked from below by a screw that passes through the shuttle wall so that its position relative to the top cushion can be adjusted. (2) A guide ring is provided on the mounting of one of the cushions so that the weft takes up a definite position between the cushions. C.

Tongue-type High-speed Knitting Machine Needle. S. G. Dehn (for Vanity Fair Mills Inc.). B.P.623,574 of 2/10/1945: 19/5/1949. The claims are for means for forming, arranging and combining the various parts of the high-speed tongue-type needle covered by B.P. 601,020 so that it can be manufactured without soldering, brazing, welding or pinning the parts together. (See also *J. Textile Institute*, 1948, **39**, A528.) C.

Weft-replenishing Loom Temple Weft Cutter. Frank Chambers. B.P.623,608 of 3/5/1947: 19/5/1949. A cutter is pivoted on a loose bush by the side of a stationary cutter on the pin that fixes the temple to its head bracket, the two cutters being spring-pressed together. There is a tailpiece on the pivoted cutter for engagement with one arm of a two-armed lever also pivoted on the temple head bracket. The other arm of the lever is struck by the sley (or a fitting thereon) as it comes forward, whereby the cutters come together and the weft is severed close to the selvedge. C.

Gripper Loom. Henry Senior. B.P.623,735 of 11/4/1946: 23/5/1949. The claims are for a loom, and the fabric woven on it, in which a double-ended gripper takes weft from stationary packages at opposite sides of the loom and each pick is severed from its supply after insertion in the warp shed. The jaws of the gripper are opened and closed by internal cam mechanism. Picking may be performed by pneumatic means. C.

Yarn Package Storage and Delivery Magazine. British Celanese Ltd. B.P. 623,769 of 20/11/1946: 23/5/1949 (Conv. 20/11/1945). A magazine for storing and delivering yarn packages (*e.g.* pirns) is fitted with a series of sloping shelves down which a package makes a zig-zag descent until it emerges at a hopper. When lifted out of the hopper its place is taken by the next package. C.

Circular Knitting Machine Wrap Pattern Mechanism. Hemphill Co. B.P. 624,182 of 23/7/1946: 30/5/1949 (Conv. 27/7/1945). A knitting machine having co-axial superposed needle cylinders is fitted inside the cylinders with a rigid wrap horn the inner edge of which is of unbroken curvature in the direction of its tip to a point at which the leading one of a group of needles in the lower cylinder which have been selected for wrapping is about to enter the upper cylinder, the curvature being abruptly stepped to reduce the thickness of the wrap horn at this point and then continuing unbroken to the tip so that the strain imposed by the wrap horn on the needle is relieved as this is about to enter the upper cylinder. C.

Verdol Pattern Card Shedding Motion. R., H. and O. Staubli (Gebr. Staubli & Co.). B.P.624,368 of 16/7/1946: 7/6/1949 (Conv. 16/7/1945). A shedding motion for use in weaving with Verdol pattern cards and a reading device for controlling the draw hooks during the lost motion of the lifting knives is characterized by the feature that means are provided by which only those draw hooks fall into the path of their lifting knife when this is in its rear position, which according to the pattern card have to open the shed for the following pick when the loom is turned forward, or have to open the shed of the preceding pick if the loom is turned backwards. All the other hooks which act together with the other lifting knife, this being at the moment in its drawn-out position, remain steady although the picks actuated by these hooks have been read off on the pattern card. Details are shown in seven sheets of drawings. C.

4—CHEMICAL AND FINISHING PROCESSES

(B)—Boiling, Scouring, Degumming and Washing

Alkaline Scouring of Dry Spun Flax Yarns: Effect upon Physical Properties of Yarns and Fabrics. H. L. Parsons. *J. Textile Institute*, 1949, **40**, T424-444. The effects of various alkaline scours on three types of flax—retted tow, retted line, and unretted tow—were examined. Each type was boiled in alkaline liquors to give residual alkali solubility numbers of grey 15 per cent., 10 per cent. 5 per cent. and 2 per cent. (nominal). Warps and wefts were in each case woven into fabrics of the same construction. The testing of the yarns and fabrics is described and results are given. The effects of the different scourings on yarn grist, tensile strength, twist, weight loss, alkali solubility, and solubility in 5 per cent. caustic soda solution, and on fabric tensile strength

and tear strength are discussed. The grey yarns had been spun so that, on boiling, the grists would be equal for all. The grists were as expected. The tensile strength of the retted tow yarns increased slightly, the retted line yarns were not affected, and there was a marked decrease in the unretted line yarns (all in the conditioned state). The tensile strength of all yarns, when saturated with water, appeared to increase by about 9 per cent. when boiled. Boiling has a slight, but definite, increasing effect on twist. A simple linear relationship exists between the loss in weight in scouring and residual alkali solubility, provided that the scouring treatment removes virtually all the remaining soluble matter. A 5 per cent. caustic soda boil is suggested. The tensile strength of the retted line and the tow fabrics increases as the alkali soluble content decreases, in the conditioned and saturated states. This is true also for natural flax line fabrics in the natural state, but the tensile strength of the conditioned fabrics first decreases and then returns to its grey value at the highest cellulose content. In the conditioned state the fabric tongue tear strength of retted tow fabrics appeared to be unaffected, that of retted line fabrics increases, and the natural line fabrics tend to follow as the degree of scouring increases. On saturation all tend to increase as scouring increases. L—**4B.**

(E)—Drying and Conditioning

Drying: Review. S. J. Friedman. *Ind. Eng. Chem.*, 1950, **42**, 38-44. Work done on drying during 1949 is reviewed under the headings: infra-red drying; special drying methods; drying of specific materials (including textile); drying equipment; and moisture effects and movement. There are 237 references to the literature. C—**4E.**

(G)—Bleaching

Cotton Fabrics: Continuous Hypochlorite Bleaching Process. L. P. Seyb and J. L. Foster. *Amer. Dyes. Rept.*, 1950, **39**, 20-26, *Textile Industries*, 1950, **114**, No. 1, 109, 111. A process is proposed for bleaching cotton goods by continuous methods utilising, essentially, caustic soda and sodium hypochlorite solutions. The three major steps involved are: (i) Treatment of grey goods with a sodium hypochlorite solution of controlled *pH*, concentration and time, (ii) Impregnation of the treated goods with caustic soda followed by steaming, and (iii) Treatment of steamed goods with a sodium hypochlorite solution of controlled *pH*, concentration and time. With proper equipment it is believed that the entire process could be performed continuously, requiring no longer than two hours total processing time. Small and large scale laboratory investigations and commercial scale trials have been carried out. Results show that a fabric is obtained which has better whiteness and tensile strength than that usually obtained by classical procedures. C—**4G.**

Bleaching Control Instruments. ("Automatic Instruments Control Ware Shoals Bleaching.") J. M. Bennett. *Textile World*, 1950, **100**, No. 1, 94-96. Automatic instruments for the control of bleaching have been installed by an American textile company. Temperature control at all necessary points is regulated by electronic potentiometers with pneumatic control action. Steam level in the J box is accurately maintained by means of a thermocouple which operates a recording flow controller in turn regulating the steam supply valves. All the instruments used record their performance on charts which are of value for the economic operation of the plant. The installation of the apparatus is shown in diagrams and photographs. C—**4G.**

(I)—Dyeing

American Dyes, Pigments, Textile Chemicals and Processing Equipment: Development in 1949. ("Alphabetical List of New Products Developed Since November, 1948.") *Amer. Dyes. Rept.*, 1949, **38**, 877-908. An alphabetical list is presented of dyes, textile chemicals, and laboratory and wet processing equipment, which have been placed on the market since November, 1948. For each product the name of the manufacturer, the properties claimed for it, and recommended uses are given. Some illustrations of equipment are included. (See also *J. Textile Institute*, 1949, **40**, A100.) C—**4I.**

Enclosed Dye Winches: Application with Rayon Fabrics. D. K. Ashpole, R. A. McFarlane and C. C. Wilcock. *J. Soc. Dyers & Col.*, 1950, **66**, 17-27. An account is presented of investigations of the use of enclosed winches for dyeing and their advantages in respect of fuel economy are stressed. Difficulties

in designing a satisfactory and convenient hood are discussed, mention being made of the Swedish type of enclosed winch. British machines are described and their performances are examined. Owing to the higher temperature of dyeing certain precautions are needed. One effect is the increase of the quantity of bicarbonate converted to carbonate, causing a rise in the *pH* of the dye liquor. Ammonium sulphate is effective in preventing this rise in alkalinity. C—**41.**

Cellulose Acetate Materials: Effect of Strain on Saponification. (1) C. P. Tattersfield; (2) F. Happey. *J. Soc. Dyers & Col.*, 1950, **66**, 9-16. (1) An investigation has been carried out on the effect of strain on the ease of saponification of "Seraceta" cellulose acetate. Strain was produced by either tension, pressure, or abrasion, and the degree of saponification produced by caustic soda, caustic potash, or soda ash was measured by the increase in affinity of the material for direct cotton dyes. Strain effects an increase in the ease of saponification but prior treatment of commercial acetate yarns and fabrics with hot water or especially hot sodium chloride solution reduces the ease of saponification and eliminates any tendency of saponification due to strain. Experimental methods and conditions are described and potential uses of the technique are discussed, *e.g.* in deciding whether a particular defect is due to physical strain. Several plates of photographs of cellulose acetate yarns and materials, which have been treated by this technique, are reproduced and show clearly the effects described. Some theoretical speculations are made in explanation of the phenomena reported. (2) In an appendix F. Happey comments on fundamental aspects of differential saponification. A discussion of the paper is reported. C—**41.**

Cellulose Acetate Staple Fibre Mixtures: Dyeing and Finishing. A. Mellor and H. C. Olpin. *J. Soc. Dyers & Col.*, 1950, **66**, 44-50. A discussion is presented on the dyeing and finishing of mixtures of Celafibre (staple cellulose acetate) with viscose and wool. Dyeing and finishing details are given for each mixture. Gas fading on Celafibre mixture fabrics is discussed and the desirable properties of the ideal inhibitor are listed. In this respect properties of diphenylacetamidine and diphenylethylenediamine are tabulated. For the Celafibre/wool mixtures resist dyes for each component are listed and the main points to be observed in the dyeing are mentioned. The paper is followed by a short discussion. C—**41.**

Dyed Textile Materials: Stripping. ("Methods and Reagents Used in Getting the Colour off.") A. G. Tyler. *Dyer*, 1949, **103**, 23-25, 27. An account is given of the stripping of dyes from textile materials. The influence of fibre, class of dye, and condition of material on the choice of the stripping agent is discussed. C—**41.**

Hosiery: Dyeing. (1) ("Berkshire Hosiery Dyeing Methods Heard by A.A.T.C.C.") (2) ("Wet Processing Full-Fashioned Hosiery.") H. L. DeTurck. (1) *Textile World*, 1949, **99**, No. 12, 114-115, 208, 210, 212, 214, 216, 218, 220, 222; (2) *Textile Industries*, 1950, **114**, No. 1, 137-138. The paper discusses techniques of and experiments on dyeing and finishing of multi-filament, 15-den. monofilament, and 20-den. monofilament hosiery by Berkshire Knitting Mills, U.S.A. The discussion of the 15-den. and 20-den. hosiery covers the following topics: scouring, dyeing assistants, dyes (including acetate, Nydyes, direct colours, chrome colours, and neutral acid dyes) and the Dunn method. Single- and double-bath dyeing are discussed, the former being successful for multifilament hosiery, and formulæ are given for the preparation of the various solutions used in dyeing and finishing. C—**41.**

Indian Dyeworks: Management. ("Indigenous Dyeing Processes of Madura and Tinnevelly.") V. G. Ramakrishna Iyer. *Indian Textile J.*, 1949, **60**, 137-139. A brief account is presented of the dyeing industry in the Madura and Tinnevelly areas of India. Traditional and modern dyes and dyeing practices are discussed. C—**41.**

Naphthol and Vat Dyes: Application. ("Fast Colorings Obtainable with Naphthol and Vat Dyestuffs.") R. H. Nuttall. *Amer. Dyes. Rept.*, 1949, **38**, 923-924. A brief account is given of present methods of dyeing hosiery, yarn packages and beams, and piece goods, using Naphthol and vat dyes. C—**41.**

Nylon: Dyeing by Geigy Chrome Steam Process. Geigy Co. Inc. *Rayon & Synthetic Textiles*, 1949, **30**, No. 12, 88-90. The development of the Geigy chrome steam process for dyeing nylon is described and details of the dyeing procedure for yarn packages and piece goods are given. C—**41.**

Orlon Acrylic Fibre: Dyeing. ("The Dyeing of 'Orlon' Acrylic Fiber and its Use in Colored Textiles.") R. J. Thomas and P. L. Meunier. *Amer. Dyes. Rept.*, 1949, **38**, 925-932. Orlon continuous filament yarn may be dyed in pastel shades at the boil with dispersed acetate colours but the economy of dye is poor. Unorthodox dyeing procedures involving temperatures above 212° F. under pressure or the use of aromatic dye-bath assistants are required for the production of heavy shades with the acetate dyes. Indigoid and thioindigoid vat dyes yield medium-strength, fairly light-fast dyeings at the boil from baths containing a high concentration of potassium carbonate, but complete penetration of the individual filament is obtained only at temperatures substantially above 212° F. Except in light shades, however, the crock fastness of vat colour dyeings is usually not good. Resin-bonded pigments are likely to be used to a considerable extent in colouring fabrics made of Orlon acrylic fibre. Prints of basic and acetate dyes are fixed by ageing for 30 minutes at 15 to 25 p.s.i. or, if resorcinol is incorporated in the paste, at atmospheric pressure. Selected vat dye prints require only a ten-minute rapid ageing but are deficient in fastness to crocking. The staining of Orlon yarn when used as an effect thread in worsteds and cotton fabrics is also discussed. Experimental data are tabulated and a brief discussion of the paper is reported. C—**41.**

Superpolyamides: Dyeing. (1) ("Quelques nouveautés dans la Teinture des Superpolyamides".) (2) ("Einige neue Erkenntnisse über das Färben der Superpolyamide".) J. P. Niederhauser. (1) *Teintex*, 1949, **14**, 407-429. (2) *Textil Rundschau*, 1949, **4**, 400-405, 442-453. The structure of the principal polyamides is reviewed and results are reported of an investigation in which superpolyamides were dyed with acid colours in dyebaths of varied *pH* (below and above 2·5). An explanation for the abnormal results obtained when combinations of acid dyes are applied to polyamides is proposed, and it is shown that satisfactory results can be obtained when dyes with the same dgree of sulphonation are used. Monosulphonated dyes can displace disulphonated dyes already fixed on the fibre. Acid dyes suitable for the dyeing of nylon are classified into three groups according to their degree of sulphonation. The dyeing of wool/nylon blends is discussed, and three different possibilities (i) uniform shade on both fibres, (ii) dyed wool and reserved nylon, and (iii) cross-dyeing are considered in particular. C—**41.**

Indophenol Dyes: Unusual Light Absorption. Heinz Schulze. *Z. Naturforschung*, 1947, **2***b*, 400-404 (through *Chem. Abstr.*, 1949, **43**, 7231[i]). By coupling N:N-diethyl-*p*-phenylene diamine with a 1:2-hydroxybenzamide containing a strongly polar group on the N substituted ring, a purple dye can be obtained instead of the usual blue-green. Thus, 6-hydroxy-4:5-dimethylbenzanilide when coupled yields a blue-green dye, whereas 2-(6-hydroxy-4:5-dimethylbenzamido) benzoic acid yields a dye with an absorption maximum at 545 mμ. Eighteen examples are given. C—**41.**

Fading and Degradation Testing Light Sources: Spectral Characteristics. B. S. Cooper and F. S. Hawkins. *J. Soc. Dyers & Col.*, 1949, **65**, 586-596. The spectral distribution of energy in the visible and ultra-violet regions has been measured for the enclosed carbon arc (A.C. and D.C.) commonly employed in fading test apparatus. The effects of electrical loading, asymmetrical polar distribution, and obscuration of the enclosing globe have been investigated. Data including some spectrum photographs are also given for the high-intensity carbon arc and for three types of metal-vapour electric discharge lamp likely to be suitable for photochemical work. Comparison is made with incandescent tungsten sources and with sunlight for corresponding spectral regions. A discussion of the paper is reported. C—**41.**

Dyeings: Light Fastness Testing. T. H. Morton. *J. Soc. Dyers & Col.*, 1949, **65**, 597-605. The testing of light fastness of dyeings against standards such as those of the Society of Dyers and Colourists is considered. Certain anomalies are found in practice, since the sample and dyeing do not necessarily follow the same course of fading. The discrepancies are examined on the basis of simple theory, and certain recommendations are made in respect of the

practice of light-fastness testing. The influence of quality of light, atmosphere and mixture of dyes is considered. A discussion of the paper is reported. C—**41.**

Dyeings: Quantitative Light Fastness Measurement. T. Vickerstaff and D. Tough. *J. Soc. Dyers & Col.*, 1949, **65**, 606-612. The conditions and criteria of light fading tests are reviewed. Some results obtained with pigments are presented. It is suggested that greater precision could be obtained by closer control of fading conditions, including photo-electric measurement of light exposure, together with improved methods of assessing colour change in terms of the number of just-noticeable differences of colour from the original shade. A discussion of the paper is reported. C—**41.**

Dyes: Action of Light. E. J. Bowen. *J. Soc. Dyers & Col.*, 1949, **65**, 613-617. A brief account is given of some new theoretical concepts in photochemistry. Excited singlet levels of dye molecules formed by absorption of light may pass to triplet or "diradical" levels, which may be chemically more reactive. Many of the photo-reactions of dyes have been formally interpreted as "electron transfer" reactions, but details of the process are usually obscure. It is suggested that experiments to bring out the properties of the triplet levels would be helpful. A discussion of the paper is reported. C—**41.**

Simple Monoazo Dyes: Fading. E. Atherton and I. Seltzer. *J. Soc. Dyers & Col.*, 1949, **65**, 629-638. The fastness, on exposure to the light from a carbon arc, of a series of simple monoazo dyes in cellulose acetate film has been measured and a relationship is proposed between the chemical constitution and the order of light fastness of these dyes. The fastness of each dye is characterised by a destruction efficiency constant which takes account of the specific absorbing powers of the dyes for the hetero-chromatic light used to fade them. Special precautions have been taken to standardise exposures by means of a light flux-time integrator. A discussion of the paper is reported. C—**41.**

Vat-dyed Cellulose: Tendering Action of Light. A. Landolt. *J. Soc. Dyers & Col.*, 1949, **65**, 659-673. The tendering activity of 38 vat dyes has been examined and an attempt is made to discover what substituents in the dyes are responsible for tendering or non-tendering properties. Experimental results are presented and graphs show (1) the effect on tensile strength at different depths of shade, and (2) the light reflectance at different wavelengths. Most of the anthraquinone-carbazole dyes tested are non-tendering. In other groups of dyes certain substituents appear to exert a tendering influence and others a protective action. Both oxidation and reduction phenomena can be brought about by irradiating cotton dyed with vat dyes, which indicates that the tendering reaction may be caused by a succession of reducing and oxidising processes. A discussion of the paper is reported. C—**41.**

Soaping and Washing Equipment. Stephen Major. *Textile Recorder*, 1950, **67**, January, 75-76. A new washing and soaping range manufactured by F. Smith and Co. (Whitworth) Ltd., is briefly described and illustrated. Each mangle has a controlled and variable drive which compensates for changes in the tension of the material as it passes through the becks. This adjustment can be operated by hand or by means of a mechanism which makes the process automatic. This device is controlled by compensating rollers over which the cloth passes and as the tension changes, corresponding movement of the rollers controls the supply of compressed air to a piston. This piston actuates a variable speed mechanism in such a way that the variations in cloth tension are minimised. Another feature is the pneumatic control of mangle roller pressure. The machine incorporates electrically driven centrifugal pumps and special starting, "inching" and stopping control. C—**41.**

Glass Fibre: Colouring. W. Garner. *British Rayon & Silk J.*, 1950, **26**, January, 74-75, 82. The colouring of glass fibres may be carried out by (*a*) colouring the melt before spinning, or (*b*) superficial coating of the fibre. The first method is impracticable for textile purposes. Some patented methods for applying colour to glass fibres by the second method are discussed. The modern techniques attempt to produce a continuous film round the fibre of some material which will take the dye. C—**41.**

Vat-Craft Dyeing Process. (1) ("Photochemical Process Vat Dyes Fabrics Continuously.") (2) ("Successful Application of Atomic Energy in Dyeing.")

(3) ("High Speed Dyeing.") (4) ("Vat-Craft to Licence New Process.") Vat-Craft Corporation Inc. (1) *Textile World*, 1950, **100**, No. 1, 99; (2) *Rayon & Synthetic Textiles*, 1950, **31**, No. 1, 79-80; (3) *British Rayon & Silk J.*, 1950, **26**, January, 62-63; (4) *Dyer*, 1950, **103**, 89-90. Brief illustrated descriptions are given of a continuous vat dyeing method employing a radio-active catalyst, UA-1. Cellulose acetate, nylon and Orlon can be dyed by this process as well as viscose rayon and cotton. The Vat-Craft machine consists of four units, two padders, a development chamber, and a washer. The development chamber contains thirty lamps producing 3,750 watts each; a silica-glass screen and a vapour spray keep the cloth temperature down to about 100° F. (See also *J. Textile Institute*, 1950, **41**, A20.) **C—41.**

Viscose Rayon: Dyeing; Influence of Electrolytes. *British Rayon & Silk J.*, 1949, **26**, December, 46-47. The influence of electrolytes on the dyeing of viscose rayon with direct dyes is discussed. The differences in sensitivity of different direct dyes to an electrolyte are described and some figures are given showing the amount of sodium chloride required to produce the same equilibrium exhaustion for various dyes. It is pointed out that for economical dyeing dyes should be mixed only if their equilibrium exhaustion values are reasonably near each other. The problem of employing the correct rate of sorting is discussed, and it is stressed that good results depend on experience and a judicial application of the results of the researches made on the problem. **C—41.**

Azo Dyes: Oxidation; Relation to Light Fading. N. F. Desai and C. H. Giles. *J. Soc. Dyers & Col.*, 1949, **65**, 639-649. In the oxidation of azo dyes in aqueous media with several common reagents, including ceric sulphate, potassium dichromate, and hydrogen peroxide, the azo group is disrupted with formation of a diazo compound and a quinone. These further decompose to give, respectively, a phenol and nitrogen (in acid media) and phthalic acid. It is suggested that the initial step in such oxidations is one of hydrolytic attack on the $-C=N-$ bond of the hydrazone tautomeride of the dye. This is shown to fit the facts by a study of the relative ease of oxidation of several phenylazo dyes of both soluble and insoluble types, with different substituents in the benzene ring. Light fading data support this theory for insoluble azo dyes, but many soluble dyes behave in an opposite sense. There are 33 references to the literature. **C—41.**

Dyes: Irreversible and Reversible Photo-bleaching. Robert Livingston. *J. Soc. Dyers & Col.*, 1949, **65**, 781-785. Fifteen reaction steps occur in solutions (or other simple systems) of dyes and pigments. Although no one compound has been proved to undergo all of them, they are considered to constitute the primary processes for photo-chemical reactions of dyes. An attempt is made to suggest how these reaction steps may be related to irreversible and reversible photo-bleaching of dyes under conditions of technical importance. There are 82 references to the literature. **C—41.**

Dyed Cotton and Wool: Colour Fastness Testing in Sunlight and in Artificial Light. Gösta Nordhammar and Nils Gralén. *J. Soc. Dyers & Col.*, 1949, **65**, 741-742. Spectrophotometric measurements of eight dyes on cotton or wool faded in sunlight and in the Fadeometer show the course of fading of the dyeings to be similar for the two sources of light. **C—41.**

Dyed Textiles: Anomalous Light Fastness. P. W. Smith. *J. Soc. Dyers & Col.*, 1949, **65**, 743-747. The anomalous behaviour of certain direct and vat dyes on exposure to light is discussed, and the effect of crease-resisting resins of the urea-formaldehyde type on dyeings made with direct cotton, vat, and azoic dyes is reviewed. Two photomicrographs illustrate the result of a steaming process under pressure upon an azoic dyeing on viscose rayon. **C—41.**

Dyed Textiles: Fastness to Light. S. Burgess. *J. Soc. Dyers & Col.*, 1949, **65**, 732-740. The significance is discussed of the light fastness of dyed textiles in trades intermediate between those in which it must be very high and those in which it is of little importance. The method of use of the standards of the Society of Dyers and Colourists is considered, and an account is given of a series of exposures indicating various difficulties of assessment. The problem of whether dyes that are fast but difficult to apply should be shaded with easy-levelling but less fast dyes is discussed, with some examples connected with the

dyeing of matt staple fibre for the carpet trade. A comparison is made with dyes used on wool for the same trade. The use of fading lamps is discussed, and some practical results are given of a comparison made between exposures of the same dyeings (*a*) in a Droylesden Fadeometer and (*b*) to sunlight. C—**41.**

Ixone Non-nitrogenous Vat Dye: Photo-decolorisation. Charles Dufraisse and Maurice Loury. *J. Soc. Dyers & Col.*, 1949, **65**, 786-788. Ixone, a non-nitrogenous vat dye, contains in its molecule an anthracene ring system capable under the influence of sunlight of combining with oxygen to give a colourless photo-oxide. This explains the sensitivity of the dye to sunlight and the hypothesis may be extended to other dyes containing the same structure. C—**41.**

Vat Dyes: Photosensitisation and Tendering Action. C. H. Bamford and M. J. S. Dewar. *J. Soc. Dyers & Col.*, 1949, **65**, 674-681. The relative activities of a number of vat dyes have been compared for the following photo-sensitised reactions:—(*a*) tendering of viscose rayon, (*b*) autoxidation of tetralin, (*c*) polymerisation of styrene, and (*d*) deactivation of the excited dyes by oxygen. Results indicate that the tendering of cellulose in the presence of water involves a preliminary oxidation of hydroxyl ion by the excited dye and that the main tendering action involves hydrogen peroxide as an intermediate. The detailed mechanism is discussed. The tendering of dry cellulose, or of nylon, silk, or cellulose acetate, probably involves non-chain oxidation of the fabrics by the excited dyes. A mechanism is postulated for the non-formation of hydrogen peroxide in the absence of water. The quantum yield and the intensity exponent in the tendering of moist cellulose have been estimated and the effect of the distribution of the dye in the fibre has also been studied. C—**41.**

New Azo Dyes: Recent Trends in the Search for. A. H. Knight. *J. Soc. Dyers and Col.*, 1950, **66**, 34-44. The aims of recent investigations on dyestuffs are to meet the requirements of the new fibres, to fill gaps in hue ranges and to improve fastness properties. The dyes are discussed in relation to their chemical constitution and dyeing class, *e.g.* level dyeing and fast to milling acid wool dyes and mordant wool dyes. An extensive bibliography is given. W—**41.**

Wool Dyeing: Fundamental Aspects. P. Alexander. *Canadian Textile Journal*, 1950, **67**, No. 2, 49-52, 54-55. This is a review in popular language of both the equilibrium and kinetics of dyeing. It includes a brief description of the chemical structure of the wool fibre and the conditions under which it becomes positively or negatively charged. The positive charge is responsible for the acid dyeing of wool. Anion affinity is not important in acid dyeing, but in neutral dyeing it is responsible for the dyeing taking place. The influence of varying the salt concentration in both acid and neutral dyebaths is discussed in terms of the law of mass action. The wash fastness is considered as the reverse of the dyeing process. The factors which can control the rate of dyeing are mentioned. The case where the rate of dyeing is controlled by the Nernst layer and the influence of rate of stirring and temperature on the thickness of this layer are considered in greater detail. The obstruction of the scales or sub-cuticle to dye entering the fibre and the mechanism of diffusion within the fibre are briefly considered. Two methods of obtaining tone-in-tone effects are mentioned. There are fourteen references. W—**41.**

Felt Dyeing and Processing. B. Kramrisch. *J. Soc. Dyers and Col.*, 1950, **66**, 50-52. Methods for dyeing continuous (flat) felts and hat felts (wool and fur) are discussed. The types of machines used are described, and some recent developments in the hatting industry are mentioned. W—**41.**

(J)—PRINTING

Textile Prints: Ageing. P. J. Choquette and O. F. Hakel. *Amer. Dyes. Rept.*, 1949, **38**, 919-922. Some of the principles of vat colour printing and the progress of vat-ageing technique in the United States are discussed. Data obtained by Fahnoe[1] on a pilot ager equipped with instrument control are presented and discussed. The use of improved controls in minimising plant troubles is indicated. ([1]*J. Textile Institute*, 1950, **41**, A22.) C—**4J.**

Vinyl Film: Intaglio Printing. D. C. McGiehan. *Textile World*, 1949, **99**, No. 12, 147, 200, 203. Most vinyl film is printed on the same type of single-

cylinder roto-intaglio printing machine as is used for textiles. Roller printing can give as artistic effects as screen printing. The transfer method of printing is also valuable. The roller printing machine is briefly described and illustrated diagrammatically. C—**41.**

Gum Tragacanth: Use in Textile Printing. *British Rayon & Silk J.*, 1949, **26**, December, 51-52, 67. Technical information is presented on the use of Gum Tragacanth as a thickening agent in textile printing. Methods of preparation of the tragacanth "solution" for thickening purposes are described and various aspects of its use in roller printing are discussed. These include penetration, levelness, production of fine effects, nylon printing, faulty engravings (cause and cure), and the suspension properties of the gum. C—**4J.**

Indanthrene Steamer: Application. *Textile Manufacturer*, 1950, **76**, 31-33. The history of the Indanthrene steamer is outlined and its principles and advantages and disadvantages are considered. Under the operation of the Indanthrene steamer, steam distribution, steaming instructions, steaming faults, and cylinder wrapping are discussed. C—**4J.**

Vat Dyes: Fixation in the Ager. *Textile Weekly*, 1950, **45**, 613-620. Practical advice is given on problems encountered in the ageing process for fixing vat dyes, under the headings (1) Shade variation, (2) Damage on entry and exit of the cloth, and (3) Lifting or smearing of the print colour, especially in agers of the roller type. C—**4J.**

(K)—Finishing

Cellulose Fibres and Fabrics: Effect of Crease Resisting and Stabilising Agents. ("Modification of Fiber and Fabric Properties by Wrinkle-proofing and Stabilising Agents.") D. D. Gagliardi and A. C. Nuessle. *Amer. Dyes. Rept.*, 1950, **39**, 12-19. The chemical, physical and mechanical properties of cellulose fibres and fabrics may be altered to various degrees by treatment with a large number of compounds whose action on cellulose appears to involve the formation of either chemical or physical cross-linking of the molecular chains. The formation of such cross-linkages reduces the swelling of the cellulose, changes its dyeing properties, decreases its solubility, reduces creep and fibre extensibility, raises the elastic recovery, produces crease resistance and dimensional stability, increases the wet strength of the fibres, reduces the general toughness of the fibres and produces fabrics of lower resistance to tear and abrasion at high stress application. The reduction of various strength properties is caused not by acid or heat degradation of the cellulose, but by the decrease in fibre extensibility. Various tables of data and graphs illustrate results of investigations, and a list of thirteen crease-proofing and stabilising agents and their chemical structures is presented. C—**4K.**

Polyethylene Fabrics: Finishing. American Viscose Corporation. *Rayon & Synthetic Textiles*, 1949, **30**, No. 12, 61. A brief account is given of a method by which polyethylene fabric can be stabilised to less than 2 per cent. residual shrinkage at 165° F. The fabric is pre-shrunk by passing it in flat open width through a bath of hot water (175-180° F.) under conditions of over-feed to allow 6-10 per cent. shrinkage in both warp and weft directions. The bath should be long enough to allow about 7 seconds heating time at 12 yards per minute delivery speed. Wrinkles in the pre-shrunk fabric are removed by wrapping the fabric on to a decating machine and applying steam at 212° F. Hot calendering at 140-160° F. gives a very attractive finish. C—**4K.**

Modified Cellulose and Wool Products: Developments. ("Agriculture Department Issues 1949 Progress Report.") U.S. Department of Agriculture. *Chem. Engng. News*, 1950, **28**, 459-462. In the 1949 annual report of the U.S. Bureau of Agricultural and Industrial Chemistry reference is made to the isolation of α-amylase in crystalline form, the preparation of fibres from acid-treated cottonseed protein, the development of cotton fabrics having ion-exchange properties (aminised, phosphorylated, partially carboxymethylated, and partially etherified cottons), the resistance of partially acetylated cotton to attack by micro-organisms, the production of more than 60 modified wools, the production of an artificial all-protein yarn from continuous-filament casein fibres by steeping the fibres in a 10 per cent. acid formaldehyde solution, and the preparation of stiff cloth from casein bristles. C—**4K.**

Regenerated Protein Fibre: Reactions with Formaldehyde. David Traill. *Chemistry and Industry*, 1950, 23-30. The possible reactions of formaldehyde with the various functional groups of proteins are discussed. The amino and amide groups are certainly concerned in the reactions of formaldehyde with proteins and the guanidyl, hydroxyl, and sulphydryl groups may be involved. Tables are given showing the amino-acid composition of proteins. There are 36 references to the literature. C—4K.

Melamine/Formaldehyde Pre-condensate: Application to Cotton Fabrics. ("Investigations of Anti-crease Treatments for Cotton.") R. F. Nickerson. *Amer. Dyes. Rept.*, 1950, **39**, 46-50, 62. The effect of treating standard cotton cloth (bleached, unmercerised) with melamine/formaldehyde pre-condensate has been investigated. Resin solids, cure time, cure temperature, and post-cure washing were varied separately over wide ranges. The effects on fabric behaviour of applying and stripping resin, of depositing unpolymerised resin solids, and of curing with dry and moist heat were determined. Results are presented and discussed. The existence of resin-fixing and cellulose cross-linking steps in the anti-crease process is established, and it seems that variations in cure conditions which alter the degree of cross-linking of cellulose with resin are responsible for variations in application results. C—4K.

Resin Textile Finishing Plant. ("Synthetic Resin Finishing Processes.") Spooner Dryer & Engineering Co. *British Rayon & Silk J.*, 1949, **26**, December, 42-44; **27**, January, 92. Important features of resin finishing are briefly reviewed and a range of Spooner machinery for the processing of fabrics with finishes based upon synthetic resins is described and illustrated. (See also *J. Textile Institute*, 1950, **41**, A127.) C—4K.

Rubber Covered Padding Rollers: Operation in Textile Finishing. ("Current Trends in Operating Rubber Covered Rolls in Textile Finishing.") A. F. Fisk. *Amer. Dyes. Rept.*, 1949, **38**, 646-648. Some of the factors involved in the operation of rubber covered padding rollers are discussed, with special reference to operation at high pressures. C—4K.

Embossed and Moiré Rayon Fabrics: Production. *Dyer*, 1950, **103**, 231, 233. The production of embossed and moiré effects on various types of rayon and nylon fabrics is discussed. Effects of fabric construction, temperature, scouring and dyeing conditions, and finishing conditions are considered. C—4K.

P.V.C. (Polyvinyl Chloride) Coated Fabrics: Manufacture. Imperial Chemical Industries Ltd. Leathercloth Division. *British Plastics*, 1950, **22**, 20-25. An illustrated account is given of the manufacture of "Vynide" leathercloths. Selected cotton grey cloth is used as the backing material; it is dyed, mangled, dried and coated with a polyvinyl chloride composition by spreading or by calendering. The coated fabric is embossed either by the roller technique or by plate processing. Two-colouring and finishing are briefly considered. C—4K.

(L)—PROOFING

Cellulosic Textiles: Flameproofing by Urea-Phosphoric Acid Method. F. V. Davies, J. Findlay and E. Rogers. *J. Textile Institute*, 1949, **40**, T839-T854. Resistance to flame, capable of withstanding mild laundering, can be imparted to cellulosic fabrics by treatment with urea and phosphoric acid followed by heating as described in a series of patents by the Bancroft Co., of U.S.A. The chemistry of the process is investigated. Experiments which have been carried out to study the effects of variables on the efficiency of the process are described in detail and an appendix gives eleven tables of results. C—4L.

"Erifon" Flameproofing Solution: Application. ("Durable Flame Resistance on Rayons.") E. I. du Pont de Nemours & Co. *Rayon & Synthetic Textiles*, 1949, **30**, No. 12, 67. Rayon fabrics heated with "Erifon", a solution of Ti and Sb salts, will not support combustion and the flame retardance will last the life of the fabric despite frequent dry-cleaning, laundering, and exposure to rain and sun. The durability of "Erifon" is derived from its chemical reaction with the cellulose. The application of "Erifon" is difficult and relatively expensive. C—4L.

Rubberised Textiles: "Pinking" due to Vulcanisation Accelerators. ("Staining Problems Associated with Rubber Chemicals.") James Haworth and W. R. Pryer. *Trans. Inst. Rubber Ind.*, 1949, **25**, 265-286. In a discussion of the

various types of staining phenomena associated with vulcanised rubber, mention is made of the pink staining of paper and textiles produced by the vapours of aniline *o*- and *p*-toluidine and α-naphthylamine. It has been found that a white cardboard bleached with hypochlorite, when allowed to come into contact with rubber compounds containing guanidines, aldehyde-amines and thiocarbanilide, is stained pink. **C—4L.**

Silicones: Applications in the Textile Industry. F. L. Dennett. *Amer. Dyes. Repl.*, 1950, **39**, 63-64. Silicone products which are useful in the textile industry include silicone water-repellent finishes (in particular DeCetex 104), a silicone foam discharger, silicone oils for lubrication, and silicones for insulation. **C—4L.**

Textile Materials: Rot-proofing. H. W. Partridge and G. E. Key. *J. Textile Institute*, 1949, **40**, P1077-1089. A report of a lecture in which an account is given of rot-proofing agents and methods of applying them to textile materials with particular reference to two patented methods developed by the authors.[1,2] The efficiency of the various processes for rot-proofing fabrics has been tested by the soil burial and incubation methods. The experimental data include photographic records obtained in the incubation tests. ([1] *Textile Institute*, 1948, **39**, A491; [2] *J. Textile Institute*, 1949, **40**, A106.) **C—4L.**

Carpet Beetles and Clothes Moths. *Agric. Gazette of New South Wales*, 1949, **60**, 11, 591-4. The life cycles and habits of the various species of carpet beetles and clothes moths are described, together with methods recommended for prevention of attack. **W—4L.**

PATENTS

Aminotriazine/Aldehyde Condensation Products: Preparation and Application to Textiles. American Cyanamid Co. B.P.623,355 of 13/5/1943: 17/5/1949 (Conv. 31/7/1942). The invention relates to partially polymerized colloidal dispersions of aminotriazine/aldehyde condensation products, the particles of which migrate towards the cathode in electrophoresis. They are substantive to textiles and may be used as dye and dressing agent fixatives. They are made, for example, by the acidification (*e.g.* with HCl but not H_2SO_4) under strict conditions of amount, time and temperature, of a condensation product of melamine (3 mols.) and formaldehyde (10). A phase diagram depicts the conditions for the reaction; the right conditions correspond with a blue haze. C.

Melamine/Urea/Formaldehyde Condensation Product Dispersions: Preparation and Application. American Cyanamid Co. B.P.623,361 of 26/1/1945: 17/5/1949 (Conv. 4/1/1944). [Addition to B.P.623,355, above.] A dispersion the particles of which can be deposited upon fibres (*e.g.* in paper making or in dressing cotton fabric) is obtained by acidifying a condensation product of melamine (0·7 mol.), urea (4) and formaldehyde (1-4). C.

Melamine/Formaldehyde Condensation Product Dispersions: Preparation and Application. American Cyanamid Co. B.P.623,362 of 6/2/1945: 17/5/1949 (Conv. 30/12/1943). [Addition to B.P.623,355, above]. In this modification there is added to the water 30-95 per cent. by weight of a polyhydric alcohol, such as glycerol or sucrose. C.

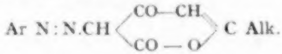
2-Nitro-4-sulpho-4′-alkyldiphenylamines: Application in Dyeing Cellulose Esters, Nylon and Wool. British Celanese Ltd. B.P.623,309 of 19/6/1946: 17/5/1949 (Conv. 21/6/1945). 2-Nitro-4-sulpho-4′-alkyldiphenylamines are obtained by condensing 2-nitro-4-sulphochlorobenzene with a *p*-alkylaniline (*e.g.* *p*-toluidine) in the presence of an aqueous suspension of magnesium oxide. They give fast yellow shades on cellulose acetate and may be discharged to clear whites with sodium formaldehyde-sulphoxylate. C.

Cellulose Acetate Bond Laminated Sheets. Arthur Felix, J. J. Horn, M. Horn and H. Horn. B.P.623,579 of 30/10/1946 and 2/7/1947: 19/5/1949. Laminated sheets are obtained by using cellulose acetate fabric as the bond and a volatile solvent to cause its disintegration under heat and pressure, *e.g.* mixtures of methyl alcohol, acetone and a plasticising agent. The fabrics to be bonded together may be soaked separately in the solvent or stitched with the cellulose acetate and then sprayed, brushed or sponged with solvent. C.

Oxidised Cellulose Surgical Dressings: Sterilisation with Formaldehyde. Parke, Davis & Co. (assignees of L. Doub and W. Kuhn). B.P.623,733 of

1/4/1946:23/5/1949 (Conv. 18/6/1945). Partially oxidised cellulose fibre (10-23 per cent. carboxyl content, obtained by means of dinitrogen tetroxide), especially as surgical dressings, is sterilised by exposure at 50-80° C. to the vapour of formalin. C.

Pyronone Mono-azo Dyes for Cellulose Derivatives. General Aniline and Film Corporation (assignees of H. W. Grimmel, A Guenther and J. F. Morgan). B.P.623,763 of 26/10/1946:23/5/1949 (Conv. 27/10/1945). Mono-azo dyes for cellulose acetate and other cellulose derivative fibres are obtained, in bulk or on the fibre, by coupling a diazonium salt with 6-ethyl- or 6-*n*-propyl-pyronone. They have the constitution



The 14 examples refer to greenish-yellow dyeings on cellulose acetate. C.

Cellulose Acetate Fabrics: Embossing. Henry Ewing (British Celanese Ltd.). B.P.623,778 of 21/1/1947:23/5/1949. Textile fabric containing a substantial proportion of a thermoplastic yarn (*e.g.* cellulose acetate fabric) is embossed by pressing it between a heated (160-180° C.) engraved member (*e.g.* a drum) and a water-soaked resilient support (*e.g.* felt or flannel at least ¼ inch thick, which may be carried by a second drum). One suggested application of the process is to emboss a fabric with a trade mark that resists laundering. C.

Glazed Textiles Containing Ethylene Polymer Fibre: Production. A. H. Little and Imperial Chemical Industries Ltd. B.P.623,805 of 15/2/1946: 17/5/1949. Yarns are spun from non-thermoplastic natural or artificial fibres mixed with a minor proportion of an ethylene polymer (*e.g.* "Alkathene", melt viscosity, at 130° C., not more than 20,000 poises), which may be coloured. The yarn or cords, braids, ribbons or fabrics made from them, are rendered smooth and glossy by subjecting them to pressure against heated smooth, metal surfaces, *e.g.* a die for yarns or a calender at a temperature below 200° C. C.

Disazo Dyes for Cellulosic Fibre. Sandoz Ltd. B.P.623,913 of 28/5/1947: 25/5/1949 (Conv. 29/5/1946). Red, bordeaux, violet and blue dyes for cotton or regenerated cellulose are obtained by diazotising an aminoazo dye of the general formula

$$HO{\cdot}C_6H_3(CO_2H){\cdot}NH{\cdot}CO{\cdot}C_6H_4{\cdot}N:N{\cdot}C_6H_2XY{\cdot}NH_2$$

(4) (A) (3) (B) (2)(5) (4)

and coupling with 2-(4′-aminobenzoylamino)-5-hydroxynaphthalene-7-sulphonic acid. (The nuclei A and B may contain further substituents; X = alkyl, alkoxyl or acylamino; Y = H, alkyl or alkoyl). The dyes may be further diazotised on the fibre and coupled with *β*-naphthol. The direct or developed dyes give very fast dyeings after a crease-resist finish. C.

Fabric Straightening and Feeding Device. Courtaulds & Co. and N. V. Burdin. B.P.623,969 of 11/6/1947:25/5/1949. The invention relates to means for feeding a web at high speed to a machine such as a stenter. The edge of the material is straightened by a series of feelers and associated retractable pins so arranged that when each feeler has made contact with the edge its associated pin rises and pierces the material at a fixed distance and the feeler and pin are then moved to and held on a set path. C.

Copperable Polyazo Dyes: Production. J. R. Geigy, A.-G. B.P.624,018 of 8/11/1946:26/5/1949 (Conv. 9/11/1945). The claim is for a series of polyazo dyes that give fast brown shades on cellulose after coppering. They are prepared by coupling diazo or polyazo dyes of the fomula

$$X{\cdot}N:N{\cdot}C_6H_2RY{\cdot}N:N{\cdot}C_6H_3(OH)_2$$

(1) (2)(5) (3)(1′) (2′,4′)

with diazo-azo compounds of the formula

$$A{\cdot}N:N{\cdot}B{\cdot}N:N{\cdot}Z,$$

where X is the radical of any desired coupling component containing OH or NH_2 in the position adjacent to the C atom at which coupling takes place and may also contain azo groups, Y is a sulphonic or carboxylic acid group, A is the radical of a salicylic acid, B is an aromatic radical and Z is an anion. A long list of components is given. C.

Stilbene Derivative Optical Bleaching Agents. D. A. W. Adams, R. H. Wilson and Imperial Chemical Industries Ltd. B.P.624,051 and 624,052 of 19/5/1947: 26/5/1949. The claims are for superior "optical bleaching agents", *i.e.* agents that emit a blue fluorescence in ultraviolet light and correct the yellowness of white materials. (I) A salt of 4:4'-diaminostilbene-2:2'-disulphonic acid (1) is condensed with cyanuric chloride (2) and diethanolamine (2), in any order, and the resultant salt of 4,4'-bis[2-chloro-4-diethanolamino-1:3:5-triazyl-(6)]-diaminostilbene-2:2'-disulphonic acid is salted out. (II) Instead of the diethanolamine in the above scheme there is used monoethanolamine (2 mols.) and a primary or secondary aliphatic or aromatic amine. C.

Laboratory Dyeing or Washing Test Apparatus. Edward Marney and Imperial Chemical Industries Ltd. B.P.624,054 of 27/5/1947: 26/5/1949. Apparatus for carrying out dyeing or washing tests is fitted with mechanism for moving the sample up and down in the liquor. A sketch is given. C.

Wood Pulp: Bleaching with Peroxides. E. I. du Pont de Nemours & Co. B.P.624,244 of 19/6/1947: 31/5/1949 (Conv. 30/3/1946). Wood pulp is expressed until it contains 50 to 70 per cent. of moisture and then in a granular form is exposed to a mist containing an organic per-acid or an alkaline peroxide. C.

Fibre Cake Liquid-treatment Apparatus. Joseph Annicq. B.P.624,441 of 16/8/1946: 8/6/1949. The object of the invention is to overcome the inconvenience caused by the lack of uniformity in the diameters of fibre cakes that have to be wet-processed, *e.g.* package-dyed. The supporting discs of the pressure-dyeing apparatus covered by B.P.602,477 are shaped at their outer edges in circular steps and at their inner edges in two or three circular steps. C.

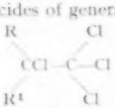
Glass Fibre: Dyeing with Direct or Wool Dyes. Ciba Ltd. B.P.624,453 of 29/10/1946: 8/6/1949 (Conv. 2/11/1945). Glass fibre is treated, before dyeing with wool or direct dyes, with a soluble reaction product of formaldehyde with a compound of the type of dicyandiamidine and then, during or after the dyeing operation, with a hardenable pre-condensate of the type of dimethylolurea. C.

Nylon Fabrics: Printing. General Aniline and Film Corporation (assignees of H. H. Bestehorn and H. W. Grimmel). B.P.624,457 of 5/11/1946: 9/6/1949 (Conv. 20/12/1945). The claim is for the use in printing on nylon of certain alkali-soluble unsulphonated metallized (V, Cr, Mn, Fe, Co, Ni, Cu and Zn) mono-azo dyes containing chelating groups (–OH, $-CO_2H$, $-NH_2$) in the ortho-position to the azo-bridge. Four examples are given. C.

Vat Dyed Polyvinyl Benzal Pigments: Production. Calico Printers' Association Ltd., L. A. Lantz, A. Schofield and E. Spinner. B.P.624,491 of 17/4/1947: 9/6/1949 (Addition to B.P.582,019). The condensation products of polyvinyl alcohol or "partial polyvinyl alcohol" (=incompletely saponified polyvinyl acetate) with aromatic aldehydes, that is, the "polyvinyl benzals" covered by B.P.582,019, are dyed in powder form with vat dyes by applying the reduced leuco dye in an alkaline medium and oxidising, *e.g.* by means of hydrogen peroxide. The washed and dried products are very fast to light and are used as pigments, *e.g.* in textile printing, in moulding powders, artists' colours, paints, lacquers and inks. Twelve examples of the process are given. A "partial polyvinyl benzal" dyed with dichloro-isodibenzanthrone is described as deep but very bright violet, "of a shade and fastness hitherto unknown among commercial pigments". C.

Polyvinyl Chloride Sheets: Joining. Greenwich Leathercloth Co. Ltd. and R. H. Czeczowitzka (of Durex Works). B.P.624,631 of 17/9/1946 and 14/3/1947: 14/6/1949. Sheets of, or coated with, "PVC" are joined without stitches by the use of an interlayer seaming tape that softens at some 30-40° C. below the softening point of the PVC. A suitable tape is made from a mixture of Vinylite VYNH (50), Perspex (20) and dioctyl phthalate. The tape is lightly coated with a coumarone resin mixed with dioctyl phthalate so as to cause it to adhere to the PVC sheets where required and the assembly is passed between pressure rollers that are hot enough to soften the tape but not the sheets. C.

Halogen-containing Insecticidal Organic Compounds: Manufacture and Use. Geigy Colour Co. Ltd. and I. E. Balaban. B.P.632,635 of 28/11/1949. The manufacture is described of insecticides of general formula



in which R and R¹ are benzene rings, substituted or not. The compounds may be either aqueous emulsions or solid compositions made by the methods described in B.P.547,871 and 547,874 respectively. They are used for insect-proofing textile and other materials. W.

Treatment of Wool to increase its Resistance to Wear. R. H. Doggett and A. R. Johnson (to Arthur D. Little, Inc.). U.S.P.2,482,578 of 20/9/1949. Wool treated with isocyanates, isothiocyanates and ketenes whose alkyl group has a chain length of at least ten carbon atoms shows increased resistance to wear. The preferred quantity of the isocyanates, *etc.*, is 4 per cent. to 8 per cent. by weight; it may be applied from solution, emulsion, a lick roll or by spraying. The treatment may be applied to wool as fibre, yarn or fabric, and is particularly suitable for paper mill felts. It has been found advantageous to heat the treated wool to at least 50° C. for at least one minute. W.

Proteinaceous Fibers: Proofing against Biological Attack. E. B. Higgins. U.S.P.2,483,008 of 27/9/1949. Protein textile fibres may be rendered proof against biological attack by treatment in a solution having a *pH* between 7 and 4 with pentachlorphenol in a finely divided state, followed by drying. This is most readily accomplished by precipitating the free phenol from its sodium salt by means of a large excess of volatile acid in the presence of a protective colloid. In the case of wool fabrics, the suspension may be added during acid milling, or to the dolly during finishing, or to acid dye baths. The process may also be combined with the application of water-repellent protein emulsions, in the presence of the salts of polyvalent metals, such as aluminium formate. W.

5—ANALYSIS, TESTING, GRADING AND DEFECTS

(A)—Fibres

Fibre Density Measurement Apparatus. S. H. Mhatre and J. M. Preston. *J. Textile Inst.*, 1949, **40**, T831-T838. An apparatus is described for the measurement of the density of fibres, from which their sorption of solutes can be calculated. The fibres are placed in a basket attached to a float and the whole is completely submerged in a suitable liquid (*e.g.* air-free water). A piece of iron wire is incorporated in the float and by means of a solenoid, in the core of which the apparatus is mounted, a pull can be exerted on it. By measuring the current passing through the solenoid, under standard conditions which have been worked out, the pull on the float can be determined. From this, the weight of the dry fibres, and other quantities which are determined when the apparatus is calibrated, the density of the fibres can be calculated. An accuracy of 2 parts in 100,000 is believed to be secured when using a 5 c.c. float. C—**5A.**

Radio-active Isotopes: Applications in Textile Research. *Textile World*, 1949, **99**, No. 12, 129, 131, 200. Some uses of radio-active isotopes in textile research are briefly described. Examples include investigation of the distribution of fibres in a blend, the evaluation of the efficiency of water-repellent and crease-resistant compounds, and the volatility of plasticisers for plastics. Photographs of the apparatus used for the detection and measurement of radiation are shown. C—**5A.**

Cellulose Fibres: Ratio of Crystalline to Amorphous Material; X-Ray Determination. L. Flaschner. *Ann. Phys. Leipzig*, 1948, [vi], **2**, 370-392 (through *Physics Abstr.*, 1949, **52**, 877). The method described involves the measurement of the relative proportions of the incident X-ray beam that are scattered into the diffraction peaks and into the background, respectively. The contribution of the amorphous part of the material is calculated according to the standard formulæ for X-ray diffraction by liquids. C—**5A.**

Indian Cotton: Staple Length of the 1946-47 Crop. Indian Central Cotton Committee. *Statistical Leaflet No.* 1 (*14th Issue*, 1946-47), 1948, pp. 9. The

Indian cotton crop of the 1946-47 season is classified according to staple length. For each cotton listed, staple length, colour, feel, blowroom loss percentage, spinning capacity, and production are tabulated. **C—5A.**

Single Fibres: Stretching Experiments. F. H. Müller. *Kolloid-Z.*, 1949, **113**, 82-90 (through *Res. Assoc. Brit. Rubber Manufs., Summary Curr. Lit.*, 1949, **27**, 955). Eight different types of fibres have been investigated, amongst them polyvinyl chloride, polyvinyl alcohol, and Perlon. Each fibre has its own characteristic graph. Slow deformation leads generally to higher maximum stretching and lower values of tensile strength. **C—5A.**

Textile Materials: Swelling. G. King. *J. Soc. Dyers & Col.*, 1950, **66**, 27-34. The author presents a survey of recent investigations into the absorbing properties of keratin and nylon. The swelling which occurs when fibres absorb certain liquids is discussed, including the relationship between swelling and regain (curves showing this relation for nylon, cellulose and wool water systems are presented). Other topics which are considered are the effect of crystalline and amorphous regions in the molecular chains, equilibrium conditions and the swelling power of solvents. In studying the latter, moduli of rigidity/sorption relations have been determined for keratin and nylon, with water, methyl alcohol and formic acid as adsorbates, and some curves are shown to illustrate the results. A discussion is briefly reported. **C—5A.**

Cotton Fibres: Elasticity. ("Studies on the Elasticity of Cellulose Fibres. I.") R. W. Asmussen and F. Anderson. *Contrib. Danish Inst. Textile Res.*, 1947, No. 3, 3-32. The mechanical properties of single American cotton fibres have been investigated at various moisture regains at 20° C. The first part of the paper gives a fairly full account of the apparatus and methods. The fibre is mounted between two clips, one of which is attached to a screw-head by which means the tension is applied, and the other is connected to a moveable plate of a condenser. As the fibre stretches the capacity of the condenser is altered and this change is measured by a high-frequency arrangement and recorded by means of an oscillograph and a moving film strip. An electromagnetic arrangement enables the moveable plate to be pulled back to its original position. By measuring the current (through the electromagnetic coil) which is required to bring the condenser plate to its initial position the tension in the fibre can be determined. With this apparatus static and dynamic (fibre subject to longitudinal vibrations) stretch measurements can be made. Some elongation tension curves are shown. They are linear for single cotton fibres in air of various degrees of humidity, but the slope increases in water and decreases with increasing humidity. The results are discussed with respect to elasticity and viscosity of the fibre. **C—5A.**

Cotton Neps: Review of the Literature. J. F. Bogdan. *Textile Industries*, 1950, **114**, No. 1, 98-107. A review of the literature on neps in cotton is presented under the following headings: definition of a nep; effects of presence of neps—end-breakage and seconds, dyeing characteristics and breaking strength, uneven dyeing; opinions on causes of nep formation; ginning; opening and scutching; carding; drawing, combing and spinning; nep reduction; and methods of sampling and expressing results. There are 95 references to the literature. **C—5A.**

Fibres: Rapid Photomicrography; Application in Dyeing and Finishing Studies. Charles Maresh and R. R. Krammes. *Amer. Dyes. Rept.*, 1949, **38**, 635-636. An illustrated description is given of a method of rapid photomicrography for recording the progress of textile dyeing and finishing processes. Photomicrographs may be obtained in approximately one minute. **C—5A.**

Dynel Staple Fibre: Properties. Union Carbide and Carbon Corporation. *Rayon and Synthetic Textiles*, 1950, **31**, No. 1, 63-64. Details are given of a new staple fibre spun from a copolymer of acrylonitrile and vinyl chloride, and known as "Dynel". The fibre is strong, resilient, warm and quick drying. It has good dimensional stability and is acid- and alkali-resistant. Dynel will not support combustion, is completely moth- and mildew-proof, can be dyed with either acid- or acetate-type colours and is easily processed on the conventional systems. Its natural colour is a light cream. **C—5A.**

Silk Fibroin: X-Ray Structure. ("An Unstable Lattice in Silk Fibroin.") O. Kratky, E. Schauenstein and A. Sekora. *Nature*, 1950, **165**, 319-320. X-ray

photographs of dried native silk fibroin present a very discrete powder diagram which does not agree quantitatively with the well-known diagram. Hence the fibroin present in native silk gland in a dispersed state forms crystals on drying. A transition to the well-known β-diagram occurs very easily. These results are discussed. An X-ray photograph of the newly found lattice type ("type 1") is shown. **C—5A.**

Silk and Nylon Mixture: Separation and Estimation of Components. ("Séparation du mélange soie et nylon et dosage des deux composants.") (Miss) —. Jafflin. *Bull. Institut Textile, France*, 1949, No. 13, 19-21. A method for the quantitative analysis of silk and nylon in a mixture is based on the fact that cupriethylene diamine completely dissolves silk but leaves nylon intact. **C—5A.**

Jute Fibre: Structure. M. K. Sen and P. H. Hermans. *Rec. Trav. Chim.*, 1949, **68**, 1079-1105. Investigations[1] into the structure of lignin have been continued. The present study deals with swelling measurements, staining of cross-sections and X-ray diagrams taken with monochromatic radiation on a series of fibres of increasing degree of purification. Swelling in water decreases with increase of number of cells in the cross-section of the fibre. The fact that the swelling of jute in water is greater than that of a pure cellulose fibre like ramie is attributed to the presence of a greater proportion of amorphous hemicellulose. Swelling in caustic soda solution has also been studied. Investigations based on the staining of cross-sections are discussed; stains used are described, some photomicrographs are reproduced and results are discussed. Observations of cross-sections in the polarizing microscope are also reported and some photomicrographs are shown. Finally, investigations with monochromatic X-rays are dealt with under (*a*) determinations of crystalline fraction, and (*b*) evaluation of monochromatic X-ray fibre photographs; some photometric tracings of these diagrams are given. General conclusions which have been reached concerning the structure of jute fibres are summarised. ([1]*J. Textile Institute*, 1950, **41**, A31.) **C—5A.**

Jute: Action of Light. H. J. Callow and J. B. Speakman. *J. Soc. Dyers & Col.*, 1949, **65**, 758-763. The chemical changes which accompany the discolouration of jute during exposure to light and air have been investigated and also the effectiveness of various methylation and acetylation treatments in preventing discolouration. Discolouration of bleached yarn during irradiation is reduced by methylation, but not entirely prevented. Bleached jute is discoloured by acetylation, but on exposure to light bleaching occurs. **C—5A.**

Textile Materials: Photochemical Degradation; Mechanism. G. S. Egerton. *J. Soc. Dyers & Col.*, 1949, **65**, 764-780. Experiments on the degradation of cotton and other textile fibres with radiation of wave-length 2537A show that degradation is not dependent on the presence of oxygen. The effect of vat dyes on the rate of degradation of cotton is discussed. All the vat dyes examined desensitised the photolytic degradation of cellulose. The photochemical degradation of cotton and other textile fibres by light transmitted through glass is increased by various dyes and pigments, and is dependent upon the presence of oxygen. The mechanism of the degradation is discussed, and the evidence for the suggestion that the degradation is due to oxidation of the fibre by activated oxygen and hydrogen peroxide is examined. Evidence is described which favours the belief that activated oxygen is a metastable form of molecular oxygen. There are 83 references to the literature. **C—5A.**

Rayon Staple Fibres: Elasticity. ("Studies on the Elasticity of Cellulose Fibres." II.) Frode Andersen. *Contrib. Danish Inst. Textile Res.*, 1947, No. 4, 3-14. The difference in mechanical properties between rayon staple and cotton fibres is investigated. Length/tension diagrams were obtained in stretch experiments where the fibre tension had been allowed to consolidate, and the elasticity modulus E was derived. A dynamic measure of E was obtained in experiments where the fibre performed longitudinal vibrations after being loaded with an inert mass at one end. After a sudden stretch, the fibre will assume a tension which decreases asymptotically to a consolidated value. This asymptotic decrease was measured photographically and from the curve conclusions concerning the viscous properties of the fibre were drawn. Finally, the fibre plasticity was investigated by measuring the elastic and non-elastic components of the stretch. Various curves are shown, and in a discussion some mechanical models are used to aid in the interpretation of the results. **C—5A.**

(B)—YARNS

Indian Cotton Yarns: Causes of Neps. A. N. Gulati. *Indian Textile J.*, 1949, **60**, 65-79, 140-152. Twenty-one samples of yarn of varied counts from twelve distinct varieties of Indian cottons have been investigated in order to obtain information on neppiness. Neps were removed from yarn wound on black cards and examined in 18 per cent. caustic soda solution under the microscope. The percentage incidence of fibre neps, seed coat fragments and leaf fragments, *etc.*, has been investigated and a chart showing the distribution of these "impurities" is given. Values of "neps per gram" give better indications of quality than "neps per unit length". Fibre neps contain either matted fibres or entangled short and immature fibres—broadly speaking 77 per cent. of neps are formed of fibre. Neppiness due to fibre-neps as indicated by neps per gram or per yard, is highly correlated with the immature component of long fibres (longer than 1 in.). A regression equation based on this correlation is recommended for predicting the neppiness of an un-spun cotton from the Balls Sorter length distributions and maturity percentages. The percentage of neps at various stages of yarn manufacture has also been studied and results are tabulated. The results of this investigation are summarised and ten tables of data and several plates of photomicrographs of nep fibres are reproduced. **C—5B.**

Single-thread Stress/Strain Diagrams: Determination under Extreme Conditions. F. H. Müller. *Kolloid-Z.*, 1949, **112**, 84-91 (through *Brit. Abstr.*, 1949, C, 396). The upper end of the thread is connected to a horizontal arm, projecting from a vertical mirror carried on two horizontal wires, or on a leaf spring for thicker threads. Rotation of the mirror, observed by the movement of a spot of light, gives a measure of the applied force. The lower end of the thread is connected to one side of an inverted U, the other side of which can be moved steadily down a rod. This allows a bath with one side inside the U to surround the thread. Calibration is done with non-extensible wire. A graphical method using curved co-ordinates gives the true modulus of elasticity from the instrument readings. **C—5B.**

Saco-Lowell Sliver Tester: Application in Yarn Regularity Tests. ("Additional Uses for Sliver Tester.") *Textile Industries*, 1950, **114**, No. 1, 153-154, 157. The Saco-Lowell sliver tester has been used to measure yarn uniformity. A number of ends from a small creel are drawn through the apparatus, up to nine ends being used. From the results, single-end variation can be obtained, it being considered that average single-end variation can be measured by a multiple-end test. Some typical results are presented and their use is discussed. **C—5B.**

Nylon Yarns: Tensile Strength Losses Produced by Irradiation. R. W. Asmussen and B. Buchmann-Olsen. *Contrib. Danish Inst. Textile Res.*, 1948, No. 5, 3-12. Lengths of nylon yarn have been sealed up in test tubes so that they were at constant temperature and in an atmosphere of constant relative humidity. Duplicate specimens were at the same time taken from the same yarn samples and were kept away from the light. The yarn in the tubes was subjected to radiation from a super-high-pressure mercury lamp (the "Intensol") for several days. Daylight irradiation tests were also made (for seven weeks' duration). At the end of the exposures tensile strength tests were applied and percentage loss in tensile strength was calculated, with the unexposed yarn as standard. Considerable drops in tensile strength were observed and are illustrated by figures and tensile strength/radiation curves. **C—5B.**

(C)—FABRICS

Clothing Fabrics: Thermal Properties. A. Giovanardi and R. Zanetti. *Atti. soc. med.-chir. Padova*, 1947, **25**, 133-134, 135-137 (through *Chem. Abstr.*, 1949, **43**, 7272[g]). (1) An apparatus for measuring average radiant temperature comprises two spheres and a single galvanometer. The difference in heat supplied to the spheres to maintain them at 36·5° C. is read directly. (2) This apparatus was used to test the protection afforded by various clothing materials against a breeze of 1 m./sec. at various temperatures. The protective factors of cloths were all greater than unity; artificial fibres and treated summer wools gave less protection than untreated wool. The direction of the weave to that of the air was important. **C—5C.**

Rotten Textile Fabric Micro-organisms: Isolation and Study. S. R. Sen Gupta, S. S. Nigam and B. B. L. Saxena. *Proc. Indian Acad. Sci., Sect. B*, 1949, **29**,

208-210 (through *Rev. Appl. Mycol.*, 1949, **28**, 534). In a new method for isolating micro-organisms from deteriorated textiles, fresh test pieces are washed with sterile water to remove superficial contaminants, and replicate strips (1½ by 1½ in.) are cut with sterile scissors and placed, mildewed surface downwards, on clean microscope slides smeared with Mayer's albumen fixative. After 24 hours the strips are peeled off, leaving impression prints on the surface of the slide. One set of slides is mounted in Canada balsam for direct examination. A second set is treated with Gram's stain for the examination of bacteria, and a third is used for the isolation of micro-organisms. The slides are washed with sterile water and placed in a sterile Petri dish. The micro-organisms are then scraped off and washed off the slides with sterile water into a flask from which dilution plates are made on Thornton's agar, nitrate-sucrose agar, and Waksman's media for the isolation of bacteria, actinomycetes, and fungi, respectively. Cellulose-destroying organisms may be readily recognised and isolated by plating in Omeliansky's medium containing cellulose suspension. C—**5C.**

Coloured Textiles: Fastness Tests in Artificial Light. W. L. Lead. *J. Soc. Dyers & Col.*, 1949, **65**, 723-731. An account is given of the effect on the fading of coloured textiles by natural and artificial light of various factors, including spectral distribution, humidity, temperature, and light intensity. Methods of using fading lamps are discussed. C—**5C.**

Dyed Cotton: Photochemical Degradation; Experimental Observations. [Miss] D. Ashton, D. Clibbens and M. E. Probert. *J. Soc. Dyers & Col.*, 1949, **65**, 650-658. Experiments are reported on: (1) the photochemical degradation of cotton sensitised by sulphur, basic, direct, and azoic dyes; (2) the influence of traces of metals, particularly copper, on the rate of photochemical degradation of vat-dyed cotton; and (3) the relation between the photochemical degradation of dyed cotton and the formation of hydrogen peroxide in the irradiated system. The samples of dyed cotton were exposed to daylight behind glass windows and the extent of oxidative degradation was measured in terms of the fluidity rise. Results are presented graphically and discussed. C—**5C.**

Dyed Textiles: Spectrophotometry. ("Absorption Measurements on Scattering Media.") Bent Buchmann-Olsen. *Contrib. Danish Inst. Textile Res.*, 1946, No. 2, 3-21. Light absorption measurements on materials such as textiles are made difficult by the scattering which occurs. Investigations into these difficulties have been carried out. In a theoretical treatment non-diffusive, partial diffusive and total diffusive transmissions are distinguished. According to these considerations, an arrangement for the determination of the transparency on scattered media has been constructed. The experimental arrangement is briefly described and the theory is discussed. Certain points to be observed in making accurate transparency measurements are indicated. C—**5C.**

Rayon Fabrics: Formation of Unwanted Permanent Creases. ("The Crease Marks that Spoil Some Rayon Fabrics.") *Brit. Rayon & Silk J.*, 1949, **26**, December, 53-54, 59. A discussion is given of conditions under which permanent creases are formed in rayon crêpes and other materials. Permanent creases are nearly always found in those fabrics which leave the loom in an unstable state and quickly shrink 20 per cent. or more on wetting. To avoid permanent creases it is necessary to see that the fabric is free from tight creases or folds while it is passing from an unstable to a stable condition. C—**5C.**

Textile Fabrics: Thermal Transmission Measurement. Gerald Winston and Stanley Backer. *A.S.T.M. Bull.*, 1949, No. 162, 62-67; *Textile Manufacturer*, 1950, **76**, 51-56. Various techniques for measuring the thermal transmission characteristics of textile fabrics have been studied with the purpose of developing a standard test. A pilot inter-laboratory investigation was first made on four materials and later extended to 24 fabrics ranging in weight from 7 to 32 oz. per sq. yd. to permit a more adequate comparison of the thermal-transmission data with the physical properties of the fabrics. All the techniques employed by the different laboratories were based upon the principle of determining the energy required to maintain a body at a constant temperature when covered by the test specimen. There was good agreement in the rankings of the thermal transmission of the various fabrics by the different laboratories. For the present, thickness values should suffice to predict fabric performance on laboratory equipment designed to evaluate the thermal transmission of fabrics under still-air conditions. C—**5C.**

Calcium Alginate Rayon: Action of Light. N. H. Chamberlain, F. Lucas and J. B. Speakman. *J. Soc. Dyers & Col.*, 1949, **65**, 682-692. Results are recorded of an investigation of the action of the total radiation of a quartz mercury-vapour lamp on calcium alginate rayon. The rate of degradation was determined in various atmospheres. Neither oxygen nor water vapour were essential for degradation. Irradiated samples were tested for tenacity, regain, viscosity and reducing power and the products of degradation were examined. When irradiation was carried out in dry nitrogen, equimolecular proportions of aldehydes and ketones were found. Chromium alginate was much more resistant to degradation than calcium alginate. A discussion is reported.
C—**5C.**

Cloth Inspection Machine. G. Durrant & Sons Ltd. *British Rayon & Silk J.*, 1950, **26**, January, 71-72. A brief description is given of a new cloth inspection machine having tensionless constant-speed drive, forward and reverse motions, a six-position tilting table, three constant speeds, and illumination by transmitted light from fluorescent lamps. The machine is particularly adaptable for the handling of fine and delicate materials. C—**5C.**

Cloth Inspection and Measuring Machine. Henry Livesey Ltd. *Textile Weekly*, 1950, **45**, 484-486. An illustrated description is given of Livesey's R-type cloth inspection and measuring machine, fitted with a 3-speed gear box for drives at constant cloth speeds of 15, 25 and 35 yards per minute
C—**5C.**

New Inspection and Measuring Machine. G. Durrant & Sons, Ltd., Bury Street, Stockport. *Wool Review*, 1950, **23**, No. 346, 23. Two standard types of machines for accurate examination of most types of fabric have been designed. The inspection table, which is illuminated from the underside, can be adjusted to six positions, and three speeds (8, 14 or 18 yards per minute) are possible.
W—**5C.**

(D)—Other Materials

Plastics: Cold-break Temperature. G. Schulz and K. Mehnert. *Kunststoffe*, 1949, **39**, 157-159 (through *Brit. Abstr.*, 1949, C, 395). The cold-break temperature is defined as the temperature at which more than 50 per cent. of samples of foil break when a looped strip (80-100 mm. long, 15 mm. wide) is drawn smartly through a slot 4-5 times the thickness of the foil. The slits are in one side of an insulated box cooled by air passed over solid carbon dioxide. The speed of pulling is not critical. Results are given for polyvinyl acetate and chloride with different plasticisers. C—**5D.**

Plastic Films: Tensile Strength; Effect of the Testing Machine. Ladislav Boor. *A.S.T.M. Bull.*, 1949, No. 162, 47-53. Four typical film materials, vinyl, polyethylene, nylon, and pure gum rubber, were investigated by various tension testing methods, covering the whole pattern of stress/strain relationships from zero load to final failure. Stress/strain curves obtained on these films with various machines, particularly the Olsen Electromatic, the Baldwin MTE, and the Instron Testing Machine, are reproduced in 21 diagrams and the results are discussed. C—**5D.**

Resin/Fibrous Glass Laminates: Ignition and Burning Characteristics. H. J. Stark. *A.S.T.M. Bull.*, 1949, No. 162, 55-58. Results on ignition time and temperature and on burning time of melamine, phenolic and polyester types of resin/fibrous glass laminates are compared. Flash and self ignition temperatures of the resins are also compared. The conclusions reached concerning burning and ignition characteristics include: (1) Melamines, having the greatest resistance to ignition and shortest burning times, are better than phenolics and polyesters. (2) Polyesters have the poorest resistance to ignition and the longest burning times. (3) Phenolics have burning and ignition qualities between those of melamines and polyesters. The equipment and test methods employed in obtaining the data are described. C—**5D.**

Wetting Agents: Evaluation. Leonard Shapiro. *Amer. Dyes. Rept.*, 1950, **39**, 38-45, 62. A woven tape modification of the Draves wetting test has been compared with the standard skein tests. The tape method has many advantages in speed, convenience, and reproducibility. The results are given of a series of tests with varied hook weights, concentrations, and temperatures. A buoyancy-balance technique has been employed to correlate the effects of varied hook weights with the rate of wetting. Re-wetting tests by the tape method are described. C—**5D.**

PATENT

Cloth Folding Test Glass ("Linen Tester"). C. S. Pyser and Edgar Chandler. B.P.623,867 of 21/5/1947: 24/5/1949. A folding magnifier for determining ends and picks in a cloth has a base member formed with a window ruled with various scales and a carrier member fitted with a magnifying glass, the two parts being connected by lazy-tong linkages. C.

7—LAUNDERING AND DRY-CLEANING

Cotton Fabrics: Preferential Wetting at Oil/Water Interface. Irving Reich and F. D. Snell. *Ind. Eng. Chem.*, 1949, **41**, 2797-2800. A technique for measuring preferential wetting of a fabric at an oil/water interface involves displacement of oils from the fibres. The time taken by the fabric to sink through the interface is measured. Preliminary results show molecularly dehydrated phosphates to be much more effective than other salts. That highly polyvalent ions are responsible for this effect is confirmed by results obtained with potassium ferrocyanide and sodium carboxymethylcellulose. A sodium alkyl-aryl sulphonate ("Nacconol NR") with molecularly dehydrated phosphates shows poorer wetting than the phosphates alone. **C—7.**

Detergency Test Cloth Samples: Reflectance Measurement. W. E. Thompson. *J. Amer. Oil Chem. Soc.*, 1949, **26**, 509-511 (through *Textile Technol. Digest*, 1949, **6**, 969). The scanning of a number of swatches on a turn-table rotating at 78 r.p.m. or faster, with a Hunter reflectometer yields the average reflectance of the set. The use of a glass plate to cover the cloth samples does not affect the reflectance measurement. Much time and work can be saved by application of the scanning technique to detergency tests employing multiple swatches of cloth. **C—7.**

Detergent Solutions: : Suspending Power for Carbon. ("Suspensibility of Carbon in Detergent Solutions.") R. D. Vold and Christine C. Konecny. *J. Phys. & Colloid Chem.*, 1949, **53**, 1262-1279. The amounts of channel black and furnace black remaining in suspension after 4 hours were determined as a function of concentration in solutions of Aerosol OT, Oronite Active, Triton X-100, *p*-toluenesulphonic acid, and sodium oleate with and without added acid, base, or salts. The mechanism of suspension, deduced from the results and confirmed by the electron microscope, is deflocculation of the coarse aggregates formed in water. This seems to be effected primarily by the ζ-potential induced on the powder, which involves adsorption of simple ions or molecules. Evidence is presented that the ability of a solution to suspend powders is not a satisfactory measure of its potential detergent power. **C—7.**

Synthetic Detergents: Use in the Textile Industry. F. D. Snell. *Rayon & Synthetic Textiles*, 1949, **30**, No. 11, 81-82; No. 12, 90-91. The nature of surface-active agents is reviewed. For discussion purposes, seven principal classes of synthetic detergents are distinguished, and illustrated in a table giving trade names of typical products in each class. Descriptions of these detergents and their textile applications are given under the headings: alkyl-aryl sulphonates, alkyl sulphonates, alkyl sulphates, sulphated monoglycerides, sulphated and sulphonated amides, non-ionic agents, and cation-active agents. **C—7.**

Textile Detergents: Evaluation. W. P. Utermohler and Mary E. Ryan. *Ind. Eng. Chem.*, 1949, **41**, 2881-2887. Methods used to measure the effects of washing procedures on soiled cotton cloth are critically examined. The method of estimating absolute dirt removal values by linear proportionality to the surface reflectance of the cloth is shown to be incorrect when applied to cloth soiled with a black iron oxide pigment, upon which both analyses and photometric measurements can be made. Evidence is presented to show that the application of one of the Kubelka-Munk colour equations to washed cloth to determine absolute dirt content is only of limited value where the dirt is black iron oxide. Chemical measurements of amounts of analysable pigment left on pieces of washed cloth may be used to obtain absolute dirt removal values in textile detergency work. There are 25 references to the literature.

C—7.

Clothes: Dry Cleaning and Dyeing. ("The Clothes Doctor.") H. Cunliffe. *Textile Weekly*, 1950, **45**, 554-558. A report of a lecture—demonstration and discussion of problems encountered by the garment dyer and cleaner. In recent years, the introduction of rubber and plastics (zip fasteners, buttons, sequins, *etc.*) have greatly added to the cleaner's difficulties. **C—7.**

PATENT

4:4′-Bis-[2-chloro-4-ethanolamine-1:3:5-triazyl-(6)]-diaminostilbene-2:2′-disulphonic Acid Optical Whitening Agent. D. A. W. Adams, R. H. Wilson and Imperial Chemical Industries Ltd. B.P.623,849 of 19/5/1947:24/5/1949. The known optical whitening agent 4:4′-diaminostilbene-2:2′-disulphonic acid is rendered more effective (due to its blue fluorescence) by condensing its sodium salt (1 mol.) with cyanuric chloride (2) and ethanolamine (2). **C.**

8—BUILDING AND ENGINEERING

(A)—CONSTRUCTION AND MAINTENANCE OF BUILDINGS AND PLANT

Stainless Steel: Textile Applications. ("Stainless Steel is the Answer to Many Corrosion Problems.") *Textile World*, 1949, **99**, No. 12, 124-125. Some uses of stainless steel in the textile industry are discussed and advantages and savings gained thereby are mentioned. Six uses of stainless steel in each of the spinning, knitting, sizing, weaving, dyeing and finishing departments are tabulated. **C—8A.**

American Hosiery Mill: Construction. *Textile World*, 1950, **100**, No. 1, 86-88. A brief illustrated account is given of a new American hosiery mill. Features include separate gray-mill and finishing plant buildings made of steel, concrete and tile; air conditioning in all departments; and functional colouring. **C—8A.**

Centrifugation Equipment: Development. J. O. Maloney. *Ind. Eng. Chem.*, 1950, **42**, 25-26. Recent work on centrifugation is reviewed with particular reference to theoretical developments and recent patents. There are 37 references to the literature. **C—8A.**

Magnesium: Use in the Textile Industry. H. H. Nuernberger. *Rayon and Synthetic Textiles*, 1950, **31**, No. 1, 41-43. Some uses of magnesium and its alloys in the textile industry are discussed. Because of its lightness and high strength-weight ratio it can be used for machine members operating in high-speed reciprocating or intermittent motion and in general for parts requiring low inertia. Mention is made of the application of magnesium to spinning, twisting and winding machines, tricot knitting machines, warp preparation equipment, looms and weaving accessories, hosiery machines and finishing equipment. **C—8A.**

Textile Machinery: Repair by Metallising Process. J. E. Wakefield. *Textile World*, 1950, **100**, No. 1, 104-105, 184, 186, 188, 190, 192. A process is described for the rebuilding of worn roller necks, journals, spindles, *etc.* by spraying the worn parts with molten metal. The gas flow to the spray gun is regulated by a flow-meter which ensures the correct flame at all times. A thin self-bonding coat of a molybdenum alloy is first applied to the worn part. The alloy undercoat can be used on most of the metals in industrial use except copper, brass and bronze where the bond is not good. The sprayed-on metal absorbs up to 10 per cent. of oil and consequently runs with less friction than does the normal metal. This process of repair is simple, speedy and shows great economy in costs. **C—8A.**

Textile Mills: Painting and Maintenance. A. Holden. *Textile Weekly*, 1950, **45**, 560-566. Practical hints are given on the painting of roofs, floors, walls and structural ironwork in spinning and weaving mills and bleaching, dyeing and finishing works. Paints based on a chlorinated rubber medium are recommended for use on walls in corrosive atmospheres. **C—8A.**

(C)—STEAM RAISING AND POWER SUPPLY

Mirrlees J.S.S. 16V Diesel Engine. ("New Power for Textiles.") Mirrlees, Bickerton and Day Ltd. *Textile Weekly*, 1950, **45**, 408-412. Particulars are given of a new diesel oil engine that develops 2270 b.h.p. at 900 r.p.m. from 16 cylinders arranged in two banks in V-formation set at 45°. **C—8C.**

(D)—Power Transmission

Electric Drives for Winding, Weaving and Knitting Machinery: Tension Control. ("Textile Winders and Let-off Drives.") A. T. Bacheler. *Rayon & Synthetic Textiles*, 1949, **30**, No. 11, 57-58; No. 12, 52-54. Electric drives for textile winders are classified into three groups on the basis of the method used for controlling the tension; (i) Machines in which the tension is established by some mechanical means (*e.g.* beamer and warper); (ii) Machines in which the tension in the yarn or cloth is established by an inherent or controlled characteristic of the electric drive (*e.g.* slasher beam drives, peripheral winders and similar let-off drives); and (iii) Machines where the speed of the material is set by the machine but the tension horse-power is not sufficient to permit regulation of tension by means of an inherent or controlled characteristic of the electric drive (*e.g.* warp knitting machines and carpet looms). Some specific applications of electric drives for these three classes of machines are described and illustrated. C—**8D.**

Textile Machinery Motor Drives: Low Voltage Problems. *Textile Recorder*, 1950, **67**, January, 80-82. The effects of low voltages (due to reductions in supply of electricity) on the running of electric motors are described. Precautions that can be taken to avoid difficulties (*e.g.* by reducing starting and running loads) are discussed for various types of motor. C—**8D.**

Textile Mills: Power Transmission. Henry Miedendorp. *Rayon and Synthetic Textiles*, 1950, **31**, No. 1, 89-91. Various aspects of power transmission in textile mills are discussed, including types of motors, line-shaft drives, anti-friction bearings, group and unit drives, smooth starting and speed control, and fluid drive controls. C—**8D.**

V-belt Loom Drives. J. H. Fenner and Co. Ltd. *Textile Weekly*, 1950, **45**, 488, 490. Illustrations are given of V-belt drives without clutches for looms and experience in Indian mills is cited. A working life of 22,000 hours is reported. C—**8D.**

(E)—Transport

Knitting Yarn Handling System. ("Winder Yarn Conveyor Saves $10,000 a Year.") G. C. Warren. *Textile World*, 1949, **99**, No. 12, 126-127, 198. A brief illustrated account is given of a conveyor system installed by an American mill for handling knitting yarn between the spinning room and winders. The yarn is carried in boxes mounted on a Richards-Wilcox zig-zag track, travels down an inclined section of rail through the floor which straightens out under the ceiling of the winding room, and is dumped in the winder creel. C—**8E.**

Rayon Cloth Beams: Handling. ("Handling Devices Reduce Damage to Cloth Rolls.") Roy Denial. *Textile World*, 1950, **100**, No. 1, 106-107. In order to simplify handling operations and to reduce wastage due to mis-handling, an American company has converted fork-trucks for the unloading and transport of rayon-fabric rolls. The use of these trucks (which are illustrated) has reduced damage and saved labour. C—**8E.**

(F)—Lighting

Nylon Hosiery Factory: Fluorescent Lighting. F. A. Westbrook. *Textile Manufacturer*, 1950, **76**, 28-29. A brief account is given of experiments carried out by an American hosiery company to ascertain the best arrangement of fluorescent lamps for maximum illumination. Photographs show some aspects of the final system, which is claimed to have produced greater efficiency of production and quality of goods. C—**8F.**

Improved Illumination: Effect on Production. *American Wool and Cotton Reporter*, 1950, **64**, No. 2, Jan. 12, 16-18. Some of the accomplishments of better lighting as announced in a report, "Lighting for Woollen and Worsted Textile Mills", by the Illuminating Engineering Society of New York are discussed. The special requirements of each process, including grading of wool, carding, spinning, weaving, *etc.*, were noted, and details are given of both the general lighting scheme, and of the installation of additional illumination for certain operations. W—**8F.**

Waste Products: Utilisation. H. Wilson. *S. African Industrial Chemist*, 1948, **2**, 154-155, 172-176. Problems of sewage disposal and utilisation are discussed, including waste waters of the galvanising and tin plate industries

and town sewage. Grease recovery from sewage, particularly in wool textile industrial areas, is discussed, together with processes for obtaining fertiliser, oils, grease and ammonia from wool waste. W—**81.**

(G)—Heating, Ventilation and Humidification

Smoke Particles: Nephelometric Determination. I. B. Shagan. *Gigiena i Sanit.*, 1948, **13**, No. 7, 20-27 (through *Chem. Abstr.*, 1949, **43**, 7271[a]). A nephelometer for aerosol studies is described with diagrams. The particle size is calculated from rate of fall measurement in a slit ultramicroscope by using the Stokes-Cunningham equation or by measurement of scattering intensity ratio at two frequencies (rather bands of frequencies, produced by colour filters), by means of a calibration curve obtained from the same samples by the above method. The results give fair agreement for zinc oxide particle size in comparison with electron microscopy. For a given size of particles the concentration can be estimated from a calibration curve. C—**8G.**

Absorption and Humidification Plant: Performance. R. L. Pigford. *Ind. Eng. Chem.*, 1950, **42**, 17-19. Work done during 1949 on absorption and humidification is reviewed under the headings: diffusion theory; performance of packed towers; mass transfer in fluidised beds; absorption and chemical reactions; design methods; and operation and plant equipment. There are 40 references to the literature. C—**8G.**

Heat Transfer: Review. G. T. Skaperdas. *Ind. Eng. Chem.*, 1950, **42**, 62-65. Work done on heat transfer during 1949 is reviewed under the headings: surface boiling; fluidised systems; compressible flow of air; convection; direct contact convection; condensation and boiling; condensation; and service and design data. There are 80 references to the literature. C—**8G.**

(I)—Waste Disposal

Textile Trade Effluents: Treatment. (1) W. P. Hazeldine; (2) L. Klein. *J. Textile Institute*, 1949, **40**, P1090-1096; P1097-1106. Reports of two lectures presented jointly. (1) An account is given of the 1938 Lancashire Rivers Board Act appertaining to the prevention of river pollution. The design and maintenance of purification plants are discussed. (2) The main polluting constituents of trade effluents and their effect on rivers are considered. General methods (physical, chemical and biological) of treating textile wastes are reviewed, and methods of treating (*a*) wool scouring effluents, (*b*) cotton mercerising wastes, (*c*) kier liquor, (*d*) cotton dyeing wastes, (*e*) cotton bleaching and printing wastes, and (*f*) viscose rayon wastes are briefly described. A discussion of the two papers is briefly reported. C—**81.**

9—SCIENCE

Thermophilic Cellulose-fermenting Bacterium: Culture and Physiology. R. H. McBee. *J. Bact.*, 1948, **56**, 653-663 (through *Brit. Abstr.*, 1949, A III, 1210). Pure cultures of thermophilic cellulose-decomposing bacteria were isolated from soil or manure. Cellobiose agar is employed, since it permits repeated transfers from isolated colonies in high dilutions in a transparent solid medium in which contaminants may be detected. The pure culture acting on cellulose produces carbon dioxide, hydrogen, ethyl alcohol, formic, acetic, lactic and succinic acids, and glycerol, accounting for 70 per cent. of the cellulose fermented. Cellobiose can be fermented, but not glucose. C—**9.**

α- and β-Amylases: Joint Action. I. A. Preece and M. Shadaksharaswamy. *J. Inst. Brewing*, 1949, **55**, 373-383. Continuing a report[1] on investigations on the joint action of α- and β-amylases in fermentation processes, the authors describe the influence of variations of enzyme ratios and concentrations and of temperature on the production of fermentable materials and also the survival of amylases at mashing temperature in malt extracts. Although at mashing temperature (*e.g.* 149° F.) β-amylase is active for no more than 15 minutes in laboratory starch conversions, its activity may persist for 40-60 minutes in malt extracts at this temperature. The activity of α-amylase, on the other hand, is lost more rapidly in malt extracts than in laboratory starch conversions, but its survival in extracts is enhanced by the use of malts of high diastatic power (D.P). A knowledge of D.P. appears to be more generally useful than that of individual amylase contents. Tables of data showing the influence of

β:α ratio and of temperature on the production of fermentable and unfermentable reducing groups and also the influence of mash concentration, temperature and D.P. on amylolytic activity, are presented. The paper includes a summary of conclusions reached as a result of the whole investigation. ([1]*J. Textile Institute*, 1950, **41**, A94.) **C—9.**

Amino Acids: Determination on Filter Paper Chromatograms by Direct Photometry. L. B. Rockland and M. S. Dunn. *J. Amer. Chem. Soc.*, 1949, **71**, 4121-22. A method is described for the determination of amino acids on filter paper chromatograms by direct photometry. Alanine and glycine have been determined in silk fibroin by a rapid, direct photometric analysis of colour intensities of filter paper chromatograms stained with ninhydrin. The silk fibroin specimen contained 43·4 per cent. of glycine and 34·9 per cent. of alanine, in good agreement with other literature values. **C—9.**

α-Cellulose: Determination. H. Doering. *Papier, Darmstadt*, 1948, **2**, 359-364 (through *Brit. Abstr.*, 1949, C, 392). In α-cellulose determinations not only the concentration and temperature of the sodium hydroxide solution but also the surface of the cellulose fibres play an important part because heterogeneous reactions are concerned. Rasping the pulp and swelling of the cellulose after mercerisation through unsuitable washing liquids lead to increases in the interfacial layers with the caustic soda lye, and thereby give incorrect values. As it is simpler to prevent after-swelling and so arrive at correct values than to incur errors of the same magnitude under the conventional conditions, it is proposed that the standard method be altered with reference to the superficial surface of the pulp. **C—9.**

Polymeric Acids: Potentiometric Titration; Theory. A. Katchalsky and J. Gillis. *Rec. Trav. Chim.*, 1949, **68**, 879-897. In a theoretical treatment of the potentiometric titration of polymeric acids it is assumed that the deviation from the behaviour of monobasic acids is due to the work expended in the removal of the hydrogen ion from the field of the ionised groups, and to the work performed by the polymer molecule on stretching by electrostatic forces. The calculation of the field effect and the molecular stretching is based on the method developed previously by Kuhn, Kuenzle and Katchalsky[1]. The model underlying the calculation is a randomly kinked polymeric chain which carries evenly distributed negative charges. The formulæ obtained have been tested with satisfactory results on potentiometric titrations of polyacrylic and polymethacrylic acids and on co-polymers of vinyl acetate and crotonic acid. ([1]See *J. Textile Institute*, 1949, **40**, A176, and 1950, **41**, A52.) **C—9.**

Water: Micro-determination. F. M. Roberts and Harry Levin. *Anal. Chem.*, 1949, **21**, 1553-1555. An account is given of a method for determining very small quantities of water in samples of oils, greases, additive concentrates, *etc.*, which employs azeotropic distillation and subsequent determination of the water in the distillate by titration with the Karl Fischer reagent. The determination is made in a special distillation system protected from atmospheric moisture, after the system has been dried by partial distillation of the azeotrope former used in the analysis itself. The method is accurate to 0·3 mg. of water. **C—9.**

Bamboo Cellulose: Molecular Weight Distribution. J. C. Aggarwala and J. L. McCarthy. *J. Indian Chem. Soc.*, 1949, **26**, 11-18 (through *Chem. Abstr.*, 1949, **43**, 7680[g]). Bamboo wood and celluloses isolated from it were nitrated with a mixture of 64 per cent. nitric acid, 26 per cent. phosphoric acid, and 10 per cent. phosphorus pentoxide. The nitrates were fractionated by precipitation from acetone with water. The average degree of polymerisation for the cellulose in the wood was 1620, and that of the isolated celluloses 1350, 775, and 1260, respectively. The celluloses show complex molecular weight distribution curves, possibly because mixed species of bamboo were used. **C—9.**

Cellulose Nitrate: Plasticisation. G. Swann. *Industrial Chemist*, 1950, **26**, 3-6. The author discusses the factors underlying the plasticisation of cellulose nitrate by camphor and iso-fenchone. Among the points discussed are the effect of crystallinity in camphor, camphor as a "solvent" for cellulose nitrate, and testing. Experimental results lead to the conclusion that the replacement of camphor in xylonite by iso-fenchone gives harder materials. **C—9.**

Cellulose Phosphates: Preparation and Properties. J. D. Reid and L. W. Mazzeno. *Ind. Eng. Chem.*, 1949, **41**, 2828-2831. Various methods of phosphorylating cellulosic materials have been investigated including the use of phosphorus oxychloride and pyridine. Cloth so phosphorylated is substantially flame- and glow-proof but has a decreased tensile strength which makes it unsuitable for the production of garments. An attempt has been made to incorporate cellulose phosphate as a glow-proofing agent into an otherwise successful flame-proofing formula. Data are given showing the effect of change of time, temperature, and molar ratio on the phosphorylation of cellulose, hydroxyethylcellulose, ethylcellulose, and cellulose acetate. **C—9.**

Cellulose Phosphates: Structure. ("Composition of two Types of Cellulose Phosphates.") J. D. Reid, L. W. Mazzeno and E. M. Buras. *Ind. Eng. Chem.*, 1949, **41**, 2831-2834. Results obtained by electrometric titration show that the combined phosphorus in cellulose phosphate prepared by treating cellulose with urea phosphate is probably entirely in the form of a monosubstituted phosphate ester. The structure of cellulose phosphate obtained by treating cellulose with phosphorus oxychloride-pyridine mixture is similar, except that, in a typical sample, approximately 23 per cent. of the phosphorus occurs in a disubstituted phosphate ester. The chlorine also present in this product is probably attached directly to the carbons of the glucose units. **C—9.**

Hemicellulose Acetate Films: Production and Properties. C. L. Smart and R. L. Whistler. *Science*, 1949, **110**, 713-714. Clear strong films may be cast from solutions of mixtures of hemicellulose-A acetate and cellulose triacetate containing up to 50 per cent. of the former. Hemicellulose-B acetate produces clear films cast from a chloroform solution, but films produced by mixing it with either cellulose acetate or hemicellulose-A acetate are all cloudy. **C—9.**

Mercerised Cellulose: Absorption and Fixation of Sodium Hydroxide. André Bréquet, Robert Viatte and Colette Chareyron. *C. r. Acad. Sci.*, 1949, **228**, 1499-1501 (through *Chem. Abstr.*, 1449, **43**, 7233[g]). The swelling of mercerised cellulose in sodium hydroxide solution plotted against the concentration of NaOH does not give a curve of three zones as is the case with native cellulose. Mercerised cellulose swollen in 0·35 per cent. NaOH by volume, then pressed, washed, neutralised, washed again and dried, swells again in a weaker NaOH solution as if it had not undergone the previous treatment. The maximum absorption of NaOH corresponds to the composition $(C_6H_{10}O_5)_2 \cdot NaOH$. **C—9.**

Cotton Plant Husks: Stepwise Hydrolysis. V. G. Panasyuk and L. V. Podobaeva. *J. Appl. Chem. U.S.S.R.*, 1949, **22**, 145-156 (through *Chem. Abstr.*, 1949, **43**, 7225[b]). Hydrolysis of cotton husks by dilute sulphuric acid in half-hour steps starting at 110° C. and progressing by 10° intervals to 190° C. gave the following results: crude husks containing appreciable amounts of cotton fibres are most resistant to total hydrolysis; the product with 25 per cent. fibre is hydrolysed completely only after a 10-step treatment, whereas a product with 16 per cent. fibre is hydrolysed in 9 steps. Most of the hemicellulose is hydrolysed at 120°-130° C., whereas cellulose proper is largely attacked at 170°-180° C. The readily hydrolysable components are xylan, araban, rhamnan and polyuronides; the difficultly hydrolysable matter is composed of mannan and cellulose. The use of 0·15 N H_2SO_4 is essentially equivalent 0·2 N H_2SO_4. The more readily hydrolysable substances give 87-97 per cent. yields of monosaccharides, whereas the more resistant give 56-61 per cent., glucose being most seriously affected by the drastic conditions. Total hydrolysis data on a representative sample give the following composition: uronic acids 5·15, rhamnose 4·19, arabinose 2·73, xylose 15·09, mannose 0·79, glucose (based on dry weight) 26·1 per cent. **C—9.**

Amylose and Amylopectin: Reaction with Iodine. R. S. Higginbotham. *J. Textile Institute*, 1949, **40**, T783-T794; T795-T808. *The Amylose-Iodine Reaction.* By the use of a much wider range of iodine concentrations than has been used hitherto it is shown that the absorption of iodine by amylose does not reach a limiting value other than that imposed by the limited solubility of iodine. The view of other workers that the absorption takes place in two stages has, however, been confirmed. In the first stage there is no simple relation between the amount of iodine absorbed and the free iodine concentration, but in the second stage the amount of iodine absorbed is a linear function of the logarithm

of the free iodine concentration. During the first stage the absorption spectrum of the absorbed iodine remains constant, but as soon as the second stage is reached it begins to change in such a way as to suggest that the additional iodine is being forced into the amylose helices which already contain iodine. *The Amylopectin-Iodine Reaction.* The composition and absorption spectra of amylopectin-iodine complexes and glycogen-iodine complexes have been determined for a wide range of iodine concentrations. Provided that the concentration of free iodine is sufficiently high, the amylopectins absorb as much iodine as amyloses do. It is inferred, therefore, that amylopectins absorb iodine partly by a helix mechanism involving chains of iodine molecules and tri-iodide ions, and partly by adsorption of single iodine molecules or single tri-iodide ions. Spectrophotometric data support this view. The proportion of iodine bound by the helix mechanism varies with the total amount of iodine absorbed and with the identity of the amylopectin. These variations may be related to the distributions of branch lengths in the amylopectin chains. C—**9.**

Apple Starch: Structure. A. L. Potter, W. Z. Hassid and M. A. Joslyn. *J. Amer. Chem. Soc.*, 1949, **71**, 4075-4077. Apple starch has been separated into amylose (24·8 per cent.) and amylopectin. Osmotic pressure measurements have been carried out on the acetylated fractions, and end-group determination by periodate oxidation has also been used. The results suggest that a single chain represents one amylose molecule (ca.560 glucose residues). The data indicate that apple starch is similar in structure to the cereal and tuber starches, with the difference that the molecular weights of its components are smaller. C—**9.**

Starch Fractions and Linear Subfractions: Properties. Sylvia Lansky, Mary Kooi and T. J. Schoch. *J. Amer. Chem. Soc.*, 1949, **71**, 4066-4075. As a preferred mode of fractionation, starch is gelatinised in a buffered Pentasol-water mixture, gently boiled under reflux for several hours, then cooled and refrigerated to precipitate the linear A-fraction. Improved methods have been developed for characterizing the starch fractions in terms of (*a*) intrinsic viscosity in 1 N potassium hydroxide solution; (*b*) iodine affinity by potentiometric titration, (*c*) reducing value toward alkaline 3:5-dinitrosalicylate reagent, and (*d*) retrogradation tendency of the linear component. These methods have been employed to describe and differentiate the linear A-fractions and branched B-fractions from corn, wheat, sago, Easter lily, potato and tapioca starches. In addition these criteria serve in detecting minor hydrolytic changes in the starch substance, in evaluating various modified starches and in elucidating the action of β-amylase on the starch fractions. A technique has been devised for sub-fractionating the A-fraction by successive partial precipitations with *n*-octyl alcohol. Some conclusions on the structure of the A-fraction are mentioned. C—**9.**

Starch Grains: Thermal Disruption. R. Brebant. *Ind. Agric. Aliment.*, 1949, 141-153 (through *J. Inst. Brewing*, 1949, **55**, 400). The effect of temperature on various starches was studied by passage of a starch paste between two heated plates, the paste being then examined microscopically. The water absorptions of the treated and untreated starches were measured by a simple decantation method. The bursting and water absorption of starch are functions of its chemical composition; starches with an ash content of less than 0·3 per cent. show a large proportion of burst grains and high water absorption at 115-120° C., whereas high-ash starches require a much higher temperature (130-145° C.) for the same effect. The water absorption and bursting are inversely proportional to the content of Ca, P and lipids. Amylose is expelled from burst granules and is not associated with any of the non-saccharide constituents of the grains. Some of the non-saccharide constituents are associated with the amylopectin portion of the starch. C—**9.**

Alkali Lignins: Mild Oxidation. R. A. V. Raff and G. H. Tomlinson. *Canadian J. Research*, 1949, **27F**, 399-418. Changes in the characteristics of alkali-lignin have been observed on mild oxidation. In particular the melting points and lyophilic properties of the lignins increase. It is suggested that these properties are mainly connected with, and possibly responsible for, the reinforcing capacity which lignins and oxidised lignins produce when mixed with GR-S rubber. This in turn is correlated with particle size, surface area and adsorptive power. Volumetric measurements of the oxidation of alkali lignin

by oxygen have been carried out; the apparatus is described and illustrated and results are presented. **C—9.**

Polymers: Pyrolysis. W. S. Penn. *Plastics*, 1950, **15**, January, 18-21. An account is given of the depolymerisation by pyrolysis of natural rubber, synthetic rubbers, polystyrene, cross-linked polystyrene, polyisobutylene, polyethylene, Perspex and polyvinyl chloride. There are 25 references to the literature. **C—9.**

Vinyl and Drying Oil Polymers: Formation; Rôle of Peroxides. L. Williamson. *J. Oil & Colour Chem. Assoc.*, 1949, **32**, 579-592. The writer first explains the mechanism of the catalytic action of peroxides in polymerisation processes by considering the polymerisation of vinyl compounds. The principles described are then applied to drying-oil polymers and a final section discusses mechanisms of bond formation during polymerisation. A discussion is reported. **C—9.**

Gases and Vapours: Permanent Hysteresis in Physical Adsorption. S. M. Katz. *J. Phys. & Colloid Chem.*, 1949, **53**, 1166-1186. A theoretical discussion is given of permanent hysteresis in physical adsorption. Self-consistency rules for the adsorption-desorption scanning behaviour of hysteretic systems are developed on the basis of both the open-pore theory and the "ink-bottle" theory of adsorption hysteresis in rigid non-swelling systems. These rules are applied to existing hysteresis data. **C—9.**

Powders: Surface Area Estimation. Masataka Mizushima. *J. Chem. Phys.*, 1949, **17**, 1357. From a thermodynamic consideration of a process whereby vapour is reversibly adsorbed by a powder, an equation is derived giving the surface area of the powder in terms of the adsorption isotherm and the contact angle between the powder and liquid. No suitable data are available to check the equation but a rough check shows it to agree, within 5 per cent., with a known result for glass and toluene. **C—9.**

Sodium Myristate: Adsorption by Carbon Black. Marguerite A. Reade, A. S. Weatherburn and C. H. Bayley. *Canadian J. Reseach*, 1949, **27F**, 426-428. The adsorption of sodium myristate from 0·1 per cent. aqueous solution by a series of carbon blacks and an activated charcoal has been measured at 70° C. In every case a preferential adsorption of fatty acid was observed. The extent of adsorption of both the fatty acid and alkali components of the soap increased with decreasing particle size, *i.e.* with increasing surface area, of the carbons. The adsorption by activated charcoal was considerably higher than that obtained with even the finest of the carbon blacks. **C—9.**

Chain Molecules Containing Branches and Rings: Dimensions. B. H. Zimm and W. H. Stockmayer. *J. Chem. Phys.*, 1949, **17**, 1301-1314. Formulæ for the mean square radii of various branched and ringed polymer molecules are developed under the usual assumptions regarding the statistics of chain configuration. For branched molecules, the mean square radii vary less rapidly with molecular weight than for strictly linear molecules, whilst for systems containing only rings and unbranched chains the variation is more rapid than for the linear case. These results show that in principle the quantity of branches or of rings can be determined from light-scattering measurements. **C—9.**

Polymer Solutions: Phase Relationships. H. Tompa. *Trans. Faraday Soc.*, 1949, **45**, 1142-1152. Statistical theories of polymer solutions are applied to the elucidation of the phase relationships of three-component systems with at least one polymer component. Phase diagrams are presented for each of the hypothetical systems considered. **C—9.**

Co-polymers: Formation; General Kinetics. ("The General Kinetics of Co-polymerisation and an Extension of the Viscosity Method to Determine Velocity Constants.") C. H. Bamford and M. J. S. Dewar. *J. Chem. Phys.*, 1949, **17**, 1188-1191. In a mathematical treatment of the kinetics of co-polymerisation, completely general kinetic expressions are developed for the co-polymerisation of n monomers, assuming that the reactivities of the radicals depend only on their terminal groups. Allowance is made for chain transfer and the fact that thermal and photochemical imitation may proceed *via* di-radicals. The equations are of the same form as those developed previously for a simple polymerisation[1] and the latter appear as a special case in which $n=1$. The method previously developed for determining the velocity constants in simple

polymerisations can be used without modification in the study of co-polymerisations. In this way 12 of the 14 velocity constants in a binary co polymerisation can be determined absolutely, and a relation between the remaining two obtained. ([1]*J. Textile Institute*, 1948, **39**, A225.) C—9.

Linear Condensation Polymers: Molecular Size Distribution for Reaction Equilibrium. L. H. Donnally. *J. Phys. & Colloid Chem.*, 1949, **53**, 1187-1189. A method is given for the calculation of the constant of polymerisation equilibrium for linear condensation polymers when the total amount of monomer and the equilibrium amount of monomer are given. With the aid of the equilibrium constant, the concentration of any individual polymer may be calculated. C—9.

Polymeric Electrolytes: Ionisation. F. T. Wall and E. H. deButts. *J. Chem. Phys.*, 1949, **17**, 1330-1334. A theory is developed for the ionisation of polymeric acids and bases (*e.g.* the hydrolysed co-polymer of maleic anhydride and styrene). Using the theory it is possible to calculate the *pH* and equivalent conductances of aqueous polymeric electrolyte solutions as functions of concentration. A general formula is derived for ionisation constants of acids and bases of any basicity. A graphical comparison of calculated and measured equivalent conductances confirms the essential features of the theory. It is also shown indirectly that the conductance of a polymeric acid is due almost entirely to the hydrogen ions. C—9.

Silver Salts: Activity in Polymerisation. G. Salomon. *Rec. Trav. Chim.*, 1949, **68**, 903-914. The formation of complex compounds between polymerisable donor molecules (including acrylonitrile, ethylene imine, vinyl compounds and dienes) and silver nitrate and perchlorate has been studied in organic solvents. The "solubility" of silver nitrate depends on the availability of π-electrons in the donor molecule and on steric factors. The liquid-complex formation is favoured by a high dielectric constant of the medium. Results are interpreted in terms of one-electron transfer reactions involving the intermediate formation of Ag^{++}. Two types can be distinguished, inter- and intra-molecular. C—9.

Casein: Absorption and Desorption of Water. I. S. Yaichnikov. *J. Gen. Chem. U.S.S.R.*, 1949, **19**, 527-530 (through *Chem. Abstr.*, 1949, **43**, 6882[b]). The rate of loss of water by casein over sulphuric acid and the rate of absorption of water by dry casein at room temperature has been studied and can be represented by equations. The final amounts of water given up or absorbed correspond to 350-475 moles, which gives the amount of polar groups in casein. C—9.

Colloid Particle Double Layers: Free Energy. ("On the Inter-action of Colloidal Particles." Part III.) S. Levine. *Phil. Mag.*, 1950, **41**, 53-65. Making use of the Poisson-Boltzmann equation, the author develops a number of theorems relating to the free energy of the electric double layers of colloidal particles in dilute sols. A general proof is given for the equivalence of two methods for determining this free energy. A clarification is offered of the difficulty that arises in the case of two infinite parallel plates, due to the infinity of the surface potential, when all the ions are supposed completely discharged. C—9.

Virus Particles: Macromolecular Weight Determination by Direct Particle Counting. R. C. Williams and R. C. Backus. *J. Amer. Chem. Soc.*, 1949, **71**, 1052-1057. A method of determining the particle weights of macromolecules suspended in a volatile medium is called that of "direct particle counts", and consists essentially of counting, on electron micrographs, the number of macromolecules per unit volume of solution, and of obtaining the dry weight of an aliquot part of the unit volume. Representative specimen fields are obtained by the spray method. Latex particles of polystyrene are used as reference particles to determine the volumes of the spray droplets, which also contain the macromolecules. The method is described for the determination of the weight of a virus particle, and the accuracy of the method is discussed. C—9.

Cellulose: Swelling in Mineral Acids. M. G. Karnik and S. C. Devadatta. *J. Univ. Bombay*, 1948, **17A**, No. 24, 40-47 (through *Chem. Abstr.*, 1949, **43**, 7679[i]). The swelling and shrinkage of sheet cellulose and of 2-fold yarn of 28s count of bleached Sakellaridis cotton were determined in 21-71 per cent. sulphuric acid and in 52-90 per cent. phosphoric acid at 40° C. In H_2SO_4 the

swelling and shrinkage increase to a maximum and then decrease with increased acid concentration; the time to maximum swelling and shrinkage decreases with increased acid concentration; the cellulose disintegrates immediately in acid concentrations greater than 69·8 per cent. In H_3PO_4 the swelling and shrinkage increase with increase in concentration of acid up to 82·8 per cent. and then decrease; the time to maximum swelling and shrinkage decreases with increased acid concentration. C—**9.**

Cellulose: Viscosity; Measurement by Nitration Method. W. J. Alexander and R. L. Mitchell. *Anal. Chem.*, 1949, **21**, 1497-1500. A simplified technique is described for rapidly determining the viscosity of cellulose by the nitration method (viscosity of the derived nitrocellulose in ethyl acetate). Data are presented to show the effect of various changes in method on the level of calculated degree of polymerisation. C—**9.**

Cellulose Solutions in Cuprammonium Hydroxide: Composition, Preparation and Viscosity. M. I. Arkhipov. *J. appl. Chem.*, U.S.S.R., 1948, **21**, 1107-1113 (through *Brit. Abstr.*, 1949, C, 393). The viscosity of cuprammonium solutions of cellulose varies with the composition and method of preparation of the solvent; in particular, nitrous acid formed during the dissolution of copper in aqueous ammonia lowers solvent power. The solution recommended is prepared from copper hydroxide and aqueous ammonia and contains Cu 13, NH_3 200, and sucrose 1 g. per l. C—**9.**

Cuprammonium Cellulose Solutions: Flow in Cylindrical Tubes. Gino Bozza. *Chimica e industria*, 1943, **25**, 233-244 (through *Chem. Abstr.*, 1949, **43**, 7681[8]). Rates of flow of solutions of varied viscosities through tubes of varied lengths and diameters were measured. The data are useful in the design of spinnerets for rayon production. C—**9.**

Pulping Waste Liquors: Viscosity. K. A. Kobe and E. J. McCormack. *Ind. Eng. Chem.*, 1949, **41**, 2847-2848. The viscosity of pulping waste liquors (sulphite waste liquor, sulphate black liquor, and soda black liquor) of various densities was determined at a series of temperatures by means of an Ostwald viscometer. Various methods of plotting the results were attempted to produce a straight line for viscosity and temperature. The logarithm of viscosity is plotted against temperature on a modified logarithmic scale. The viscosity-temperature-total solids relations are shown on a nomograph. C—**9.**

Absorption Spectra Data: Presentation. W. R. Brode. *J. Optical Soc. America*, 1949, **39**, 1022-1031. A critical survey is made of the systems used for the presentation of absorption spectra data in textbooks and journals and recommendations are made where there is some uncertainty as to proper or desirable form of presentation. Examples of data and graphical relation of values are given to show the relative form of data as presented by different systems. Notations for absorption and transmission data as used by German, French, English and American authorities are tabulated. C—**9.**

Dyes: Light Absorption Quantum Mechanical Theory. Hans Kuhn. *J. Chem. Phys.*, 1949, **17**, 1198-1212. The most important organic compounds which absorb visible light can be classified into three groups typified by; (*a*) symmetrical polymethines, (*b*) porphyrines, (*c*) poyenes. The theory which is set out in this paper is discussed under these three headings. It is shown that the position of the absorption maxima of symmetrical polymethines and related compounds can be calculated by adopting a model of the dye molecule which is analogous to the free-electron gas model used in particular by Sommerfeld (1933) to describe the condition of metals. The π-electrons of the polymethine chain are considered as a one-dimensional free-electron gas which extends itself along the length of the chain. The existence of the first absorption band is a consequence of the jump of a π-electron from the highest energy level occupied in the normal state to the lowest empty level. An expression is derived for the wave-length λ_1 of the maximum of the first absorption band of this group of dyes, and good agreement with experimental results for λ_1 is obtained. The problem of porphyrine and phthalocyanine compounds can also be dealt with on the basis of a free-electron gas model. With polyenes and related compounds the free-electron gas model is no longer applicable. Here the π-electrons are considered to be placed in a one-dimensional potential having a sine curve periodicity. An expression for λ_1 in this case is derived and confirmed by

experimental data. The results of the classical theory of Witt are capable of a simple explanation when considered in the light of the electron gas model. Many structural formulæ are shown. C—**9.**

Dyes: Spectral Changes in Colloidal Solutions of Hydrous Oxides. Benjamin Carroll and A. W. Thomas. *J. Chem. Phys.*, 1949, **17**, 1336. The spectral changes that occur when dyes are mixed with colloidal solutions have been investigated. Some results obtained with dyes that follow Beer's Law indicate that single dye ions that are bound by hydrous oxides show a spectral absorption curve distinctly different from that of the free ion. The addition of salts causes the displacement of the bound dye and the absorption spectrum is shifted back towards that of the free dye ion. Extinction curves are given to show the spectral change of Orange I caused by colloidal hydrous alumina. When dye and sol are mixed, the greater part of the spectral change takes place within a few minutes and is followed by a slow uptake of the dye by the colloidal particle. With dyes that do not follow Beer's Law, the gradual changes in the intensity, position and shape of the absorption bands generally indicate an increase in the proportions of the polymeric form of the dye. It is suggested that the use of suitable dye ions to study changes in colloidal solutions of hydrous oxides offers several advantages over the usual e.m.f. measurements. C—**9.**

Proteins: Action of Ultra-violet Radiation. R. Roberts. *J. Soc. Dyers & Col.*, 1949, **65**, 699-702. The action of ultra-violet radiation on serum-albumin has been studied. Polymerisation occurs in nitrogen but in oxygen there is a degradation of the protein molecule. The polymerisation takes place by a free-radical mechanism. The degradation in oxygen is ascribed to photo-oxidation by hydroxyl radicals. A discussion of the paper is reported. C—**9.**

Charged Particles in Electrolyte Solutions: Light Scattering. J. J. Hermans. *Rec. Trav. chim.*, 1949, **68**, 859-870. In a theoretical treatment of the scattering of light by charged particles in electrolyte solutions it is shown that the concentrations of the ions in an electrolytic solution do not fluctuate independently, and that therefore the theory of fluctuations does not represent an adequate approach to the problem of light scattering by electrolytes. Light scattering is then treated as an interference effect and the formulæ obtained from distribution functions are discussed. It is assumed in most of the treatment that a colloid particle with its double layer can be regarded as a separate unit. On this basis formulæ are developed for compact spherical particles and random coils. C—**9.**

Soap Solutions: Light Scattering. P. Debye. *Ann. N.Y. Acad. Sci.*, 1949, **51**, 575-592 (through *Chem. Abstr.*, 1949, **43**, 7292[i]). The author has studied with a photo-electric apparatus the scattering of light by solutions of soaps and *n*-alkyltrimethylammonium bromides. Critical concentration and molecular weight data are given and conclusions are drawn as to the constitution of the micelles. C—**9.**

Vinyl Acetate and Methacrylic Acid: Photosensitisation of Polymerisation. ("Photosensitisation of Polymerisation Reactions.") R. B. Whyte and H. W. Melville. *J. Soc Dyers & Col.*, 1949, **65**, 703-708. Some experiments in the photosensitisation of polymerisation of vinyl acetate and of methacrylic acid in aqueous solutions are described, the primary object being to investigate photochemical radical production in organic liquids and in aqueous solutions. The results show that radical production is quite widespread. A discussion of the paper is reported. C—**9.**

Colour Vision: New Experiments. E. Ghercke. *Ann. Phys., Leipzig*, 1948, [vi], **2**, 345-354 (through *Physics Abstr.*, 1949, **52**, 708). Rotating discs with various black and white patterns evoke red, green, blue, yellow, black and white sensations when illuminated with a sodium lamp only. The reactions of colour-blind subjects to these after-images suggest that their deficiencies lie in the conducting rather than the receptor organism. Colour sensations must be dissociated from the receptors found in the retina, which provide only one of six ways of causing the sensation of colour. There appears to be a special organ outside the retina, which is responsible for the sensation of colour. Its location is uncertain, possibly in the primary visual areas. C—**9.**

Continuous Automatic Tri-stimulus Integrator for Use with the Recording Spectrophotometer. H. R. Davidson and L. W. Imm. *J. Optical Soc. America*,

1949, **39**, 942-944. An automatic tri-stimulus integrator has been developed for use with the General Electric recording spectrophotometer. Selsyn transmitters mounted on the spectrophotometer relay the wave-length and reflectance to the computer where integration is carried out by mechanical analogue techniques. The integrations are performed continuously while the curve is being drawn at either fast or slow speed. Tri-stimulus values for any curve may be obtained by the spectrophotometer operator with no additional expenditure of time other than that required to record the values and return the counters to zero. The precision of the prototype computer is about $\pm 0{\cdot}0005$ and the absolute accuracy of the tri-stimulus values obtained is about $\pm 0{\cdot}003$. C—**9.**

Low-power Photomicrography: Reproduction of "Depth". David Charles. *Brit. J. Photography*, 1950, **97**, 42-44. The successful reproduction of depth in photomicrography is discussed. Maximum depth is obtained by extreme stopping-down, which demands complete rigidity during the long exposures necessary. Moderate magnification, followed by enlargement from the negative, and the use of a long focus lens (giving good resolution at close quarters) also help to give good results. C—**9.**

Precision Colorimetry: Principles. C. F. Hiskey. *Anal. Chem.*, 1949, **21**, 1440-1446. A method of precision colorimetry is outlined and examined theoretically. The mode of operation requires the comparison of high-absorbance standard solutions with the unknown in a photo-electric colorimeter of variable optical axis. The effects of absorption law deviations, temperature, and refractive index are briefly discussed and data illustrating the method are presented. C—**9.**

High-speed Tachometer. British Thomson-Houston Co. Ltd. *Engineering*, 1950, **169**, 27. A new type of tachometer for giving accurate direct or remote indications of rotating speeds over various ranges up to 48,000 r.p.m. is described and illustrated. A small alternating-current generator driven by the machine under test, controls the operating frequency of a quick-acting polarised-relay. This is arranged to charge and discharge alternately a capacitor in a Wheatstone-bridge network, so that the out-of-balance current indicates speed directly C—**9.**

Adhesion: Fundamental Chemical and Physical Factors. G. M. Kline and F. W. Reinhart. *Paper Trade J.*, 1949, **129**, Ind. Dev. Sect., 504-509. The types of chemical bonds which are involved in specific adhesion are discussed. An account is given of the various physical factors which affect bond strengths, including closeness of contact, surface area, and stress conditions. There are 69 references to the literature. C—**9.**

Cellulose Nitrate: Mechanical Properties and Chain Length Distribution. ("Mechanical Properties of High Polymers as Functions of the Shape of the Distribution Curve." Part III.) P. C. Scherer and B. P. Rouse. *Rayon & Synthetic Textiles*, 1949, **30**, No. 11, 42-44; No. 12, 47-49. Blends of fractions of cellulose nitrate, produced as described previously[1], have been prepared so as to give varied distribution curves and the effect of such varied curves on the mechanical properties of films cast from them have been observed. Results are presented in tables and graphs and indicate that the simple presence of rather large amounts of material of a low degree of polymerisation in a blend has relatively little effect on the physical properties. In blends of average D.P. 100 the effect of changing the shape of the curve was very pronounced. It appears that of two blends each having the maximum D.P. at the same value, the one with the narrower distribution has the better properties. For blends with the same heterogeneity of distribution, the one with the higher maximum D.P. may be expected to give the better properties. A "shape factor" has been developed and tentatively correlated with the mechanical properties. In general, as the "shape factor" increases up to a value of about 30, the mechanical property increases rapidly. Above a value of 30 very little increase occurs in the property. ([1] *J. Textile Institute*, 1948, **39**, A571.) C—**9.**

Dilute Polymer Solutions: Statistical Mechanics. P. J. Flory. *J. Chem. Phys.*, 1949, **17**, 1347-1348. The theory of intramolecular interactions in isolated polymer molecules[1] is extended to the calculation of the partition function for a pair of polymer molecules in a dilute solution. ([1] *J. Textile Institute*, 1949, **40**, A384.) C—**9.**

Rubber: Chemical and Physical Properties. J. Moore. *Brit. J. Applied Phys.*, 1950, **1**, 6-9. The chemical constitution and physical state of natural rubber in its viscous, high-elastic and crystalline conditions are described. The high elasticity of rubber is made possible by the ability of the normally coiled hydrocarbon chains to straighten and recoil. Other characteristics of rubber are explained on this concept which is extended to a consideration of other rubber-like materials including gutta percha, some synthetic elastomers (including nylon) and the silicone rubbers. C—**9.**

Solid Rods: Measurement of Coefficient of Internal Friction by a Resonance Method. W. Lethersich and H. Pelzer. *Brit. J. Applied Phys.*, 1950, **1**, 18-22. A theory is given and an expression derived relating amplitude of vibration with frequency for a rod subjected to alternating mechanical stress. The coefficient of internal friction of the material can be deduced providing the internal friction is small as, for example, with metals. With plastics the internal friction is larger, so that a correction must be applied. The physical basis from which the fundamental equations are derived is discussed and the relation between longitudinal and tangential viscosity is deduced. An expression has also been derived which enables the "volume viscosity" to be determined should experiments show the existence of this phenomenon. C—**9.**

Industrial Test Data: Multiple Factor Analysis. (1) R. Harper, A. J. Kent and G. W. Scott Blair. (2) A. J. Kent. *Brit. J. Applied Phys.*, 1950, **1**, 23-28, 28-29. (1) The technique known as "Multiple Factor Analysis" is outlined and its relevance to problems of industrial physics is discussed. In particular, the method is applied to the analysis of a set of rheological and electrical tests on plastics. Three "factors" are sufficient to account for all the observed relationships between the ten tests. Three numerical solutions have been evaluated, one involving non-orthogonal "factors" presenting the simplest solution for interpretation. All the solutions are linear transformations of one another. (2) The author indicates one way in which knowledge obtained by Multiple Factor Analysis may be developed, the vector model being interpreted in terms of current ideas on high-polymer molecules. These lead to considerations of the grouping of the vectors of the vector model which indicate that the two most important factors may be the freedom of rotation of the carbon-carbon polymer linkages and the polar nature of the plasticisers. This conception is shown to agree with the whole structure of the vector model. C—**9.**

Gossypium Hirsutum Hair Primordial Cells: Nuclear Changes. A. S. Heiba. *Egyptian Cotton Gazette*, 1949, No. 8, 27-30. Ovule samples of *G. hirsutum* have been fixed at half-hour intervals from 24 hours before anthesis until flowering time, and studied microscopically. Different stages of nuclei fission were photographed, and some of these are shown. The results show that the cultivated hairs (lint and fuzz) start sprouting as early as 24 hours before anthesis, depending on the "maturity" of the hair primordial cell. An explanation of the behaviour is outlined. C—**9.**

Bast Fibres: Lignification. ("Über die Verholzung von Bastfasern.") Tobler. *Experientia*, 1949, **5**, 398-401. The course of lignification in bast (particularly flax) fibres is considered. The process starts in the middle lamella and is a metabolic phenomenon depending on external conditions, species, and age. The effect of fibre lignification on fibre quality and ease of retting is briefly discussed. C—**9.**

Cotton Plant: Organic Acid Content. D. R. Ergle and F. M. Eaton. *Plant Physiol.*, 1949, **24**, 373-388 (through *Chem. Abstr.*, 1949, **43**, 8017h). Organic acids (citric, malic, oxalic, and unidentified), on the basis of dry weight, were present in successively lower concentration in the leaves, petioles, flowers, stems, roots, young bolls, seed kernels, and lint. Without materially changing the concentration of total acids, drought increased malic and decreased citric acid. This transformation of citric acid to malic acid is reversible. Leaves of cotton plants cultured on nitrate N had a greater total of Ca, Mg, K, and Na, but a lower total of NO_3, Cl, SO_4, and PO_4 than did plants on ammonium N. This great increase in bases relative to inorganic anions was compensated by an extra accumulation of organic acid. Comparison of the disappearance of the carbohydrate and organic acids from excised and attached leaves during five days in the dark indicated that the respiration and translocation of the acid proceed only about 20 per cent. as rapidly as does that of sugars.

Consistent correlations were not found between variations in the concentrations of the organic acids and the sugars, starch, or soluble and insoluble N. **C—9.**

Glycogen: Enzymatic Breakdown. Birger Carlqvist. *Acta Chem. Scand.*, 1948, **2**, 779-782. Enzymatic breakdown of glycogen and of partly acid hydrolysed glycogen with α- and β-amylase has been investigated. Various dextrin fractions have been prepared and their average chain-lengths are calculated. Myrbäck and Sillen's theories of branched molecules seem to be consistent with the results. Periodate oxidation of glycogen and its dextrins has been carried out and the formic acid method for determining the end-group content of glycogen has been applied. **C—9.**

Analytical Instruments: Developments. R. H. Müller. *Anal. Chem.*, 1950, **22**, 72-78. An illustrated description is given of some recent developments in analytical instrument techniques and devices under the headings: (i) primary elements, (ii) photo-multipliers, (iii) strain gauges, (iv) electronics, (v) servo-mechanisms, and (vi) research in instrumentation. There are 40 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A173.) **C—9.**

Automatic Quantitative Analysis Operations. G. D. Patterson and M. G. Mellon. *Anal. Chem.*, 1950, **22**, 136-153. Automatic analyses are discussed from the point of view of the individual unit operations involved in any general method of analysis, as applied to the sample and the desired constituent. Methods using physical properties for automatic measurement are reviewed under the following headings: gravimetry, volumetry, densimetry, manometry, viscometry, magnetometry, titrimetry, calorimetry, chronometry, sonimetry, emissimetry, absorptiometry, thermoconductometry, turbidimetry, refractometry, diffractometry, reflectometry, conductometry, potentiometry, currentimetry, dielectrimetry, and radioactimetry. There are 566 references to the literature. **C—9.**

Beckman Spectrophotometer: Application to Differential Colorimetry. Robert Bastian, Richard Weberling and Frank Palilla. *Anal. Chem.*, 1950, **22**, 160-166. The differential method of colorimetric analysis as applied to the Beckman Model DU spectrophotometer is discussed. The maximum increases in accuracy of this method over the normal one are computed for the instrument. The method has been applied to the analysis of K dichromate and permanganate solutions. The results are as accurate as those obtained with most gravimetric and volumetric methods of analysis. **C—9.**

Chromatographic Analysis: Developments. H. H. Strain. *Anal. Chem.*, 1950, **22**, 41-48. A general account is given of the nature and applicability of chromatographic analysis. The terminology is discussed. Work done during 1949 in chromatography by adsorption, by partition, and by ion exchange, in chromatography, and in paper chromatography is reviewed. There are 142 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A173.) **C—9.**

Differential Polarography with Drop Electrode. ("Polarographie différentielle avec électrode gouttante unique.") P. Levêque and (Mme.) F. Roth. *J. Chimie Physique*, 1949, **46**, 480-484. The tangent to a polarographic current/tension curve has been studied by means of a device which gives the variation of the tangent to any curve provided that the independent variable is a known function of time. A diagram of the device is given and an equation is derived expressing the slope of the tangent if the potential applied to the polarographic cell is a linear function of time. This requirement is fulfilled by using a potentiometer driven by a synchronic motor. The curves are recorded photographically. Under these conditions peaks are obtained whose height is proportional to the concentration and the resistance. The application of this method to (i) the separation of adjacent waves, (ii) the estimation of a small wave following a big one, and (iii) the determination of small traces is briefly described. **C—9.**

Extraction Apparatus: Analytical Applications; Developments. L. C. Craig. *Anal. Chem.*, 1950, **22**, 61-64. A review is given of work done during 1949 on the use of extraction procedures for the complete removal of a particular solute from a mixture and for the separation of substances of similar solubilities or of similar partition ratios. There are 45 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A173.) **C—9.**

Fluorometric Analysis: Developments. C. E. White. *Anal. Chem.*, 1950, **22**, 69-71. Developments during 1949 in fluorometric analysis are reviewed under the headings: (i) apparatus, (ii) inorganic applications, (iii) applications in biological chemistry, (iv) fluorescence in organic analysis, and (v) analysis of pharmaceutical products. There are 72 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A173.) **C—9.**

Ion Exchange Reactions: Analytical Applications; Developments. Robert Kunin. *Anal. Chem.*, 1950, **22**, 64-65. Developments during 1949 in the use of ion exchange as an analytical technique are reviewed under the headings: ion exchange chromatography; removal of interfering elements; determination of concentration; determination of equilibrium constants and activity coefficients; and electron exchange resins. There are 30 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A174.) **C—9.**

Multi-jet Polarographic Analysis Electrodes: Application. S. T. Payne. *Anal. Chem. Acta*, 1949, **3**, 686-692. Increased sensitivity and decreased oscillations in current value are obtained by means of the multi-jet technique in place of the normal methods. **C—9.**

Paper Chromatography: Development and Applications. Doris L. Clegg. *Anal Chem.*, 1950, **22**, 48-59. An illustrated account is given of the development of paper chromatography including experimental technique, apparatus, and theory. Applications to inorganic analysis, the separation of sugars, medicine, biological chemistry, and the separation of amino-acids, are reviewed. There are 229 references to the literature. **C—9.**

***pH* Control Systems.** ("Some Factors Affecting the Regulation of *pH* in Industry.") A. L. Chaplin. *Instruments*, 1949, **22**, 579-587, 608-614; 680-681, 734-748; 804-806, 838-854; 910-911, 950-954; 1010-1011, 1040-1046; 1107, 1138-1142; 1950, **23**, 38, 86-94; 152, 194-202. An illustrated series of articles covering some problems of the application of *pH* control in industry under the following headings: control rate characteristic; buffer index; acidity characteristic; equilibrium lag; the residence system; the electrodes and sampling system; process lags; some typical and approved *pH* control installations; the *pH* regulator; a graphical determination of approximate throttling-range adjustments; the reagent feed device; and liquid, gaseous and solid reagents. **C—9.**

Potentiometric Titrations: Developments. N. H. Furman. *Anal. Chem.*, 1950, **22**, 33-41. Developments in the field of potentiometric titrations during the past seven years are reviewed under the main headings: general principles; apparatus; and applications. Some of the apparatus is illustrated. There are 236 references to the literature. (See also *J. Textile Institute*, 1942, **33**, A417.) **C—9.**

Inorganic Gravimetric Analysis: Developments. F. E. Beamish. *Anal. Chem.*, 1950, **22**, 89-95. A review is presented of work done during 1949 on general procedures used in inorganic gravimetric analysis and on applications to the determination of the elements in light-alloys, alkalis and alkaline earths, steels, non-ferrous metals, rare earths and noble metals, and the non-metallic elements. There are 150 references to the literature. (See also *J. Textile Institute*, 1940, **40**, **C—9.**

Inorganic Microchemistry: Developments. P. W. West. *Anal. Chem.*, 1950, **22**, 79-89. Developments in inorganic microchemistry during 1949 are described under the headings: (i) apparatus, (ii) separations, (iii) organic reagents, (iv) bio-assay, (v) gravimetric analysis, (vi) titrimetric analysis, (vii) spot tests, (viii) colorimetric analysis, and (ix) miscellaneous. A table of colorimetric determinations and 324 literature references are given. (See also *J. Textile Institute*, 1949, **40**, A174.) **C—9.**

Inorganic Volumetric Analysis: Developments. C. J. Rodden. *Anal. Chem.*, 1950, **22**, 97-101. Work done during 1949 on volumetric methods in inorganic analysis is reviewed. There are 151 references to the literature. (See also *J. Textile Institute*, 1949, **49**, A174.) **C—9.**

Amino Acids: Microbiological Determination. Gunnar Agren. *Acta Chem. Scand.*, 1948, **2**, 797-802. An account is given of the microbiological determination of eighteen amino acids by means of seven lactic acid bacteria and the uniform medium of Henderson and Snell[1]. Standard curves are presented and discussed. ([1]*J. Textile Institute*, 1948, **39**, A170.) **C—9.**

Amino Acids and Peptides: Paper Chromatographic Analysis. C. H. de Verdier and Gunnar Ågren. *Acta Chem. Scand.*, 1948, **2**, 783-796. The use of various solvent systems in paper chromatographic techniques has been investigated. Results are illustrated. Paper chromatographic analyses of blood filtrates, liver extracts, and enzyme hydrolysed casein are reported and experimental data are given. **C—9.**

Cellulose: Determination in Nutritional Studies. E. D. Druce and J. S. Willcox. *J. Agric. Sci.*, 1949, **39**, 145-152; 153-155. I. A new, rapid method for the determination of cellulose in feeding stuffs, *etc.*, is shown to yield a fraction mainly composed of hexosan. The material is boiled with potassium dichromate solution and concentrated sulphuric acid. After filtering and washing, the material is made up to a known volume with water to which small quantities of ammonia and hydrogen peroxide are added. The cellulosic residue is filtered, washed, dried and weighed. Experimental details are given. II. The above method is compared with those of Norman and Jenkins (1933) and Crampton and Maynard (1938) and the results confirm the suitability of the new method in nutritional studies. **C—9.**

Cellulose: Determination in Straw Holocellulose. G. A. Adams and A. E. Castagne. *Canadian J. Research*, 1949, **27** B, 907-914. The hydrolysis of cereal straw holocellulose with 0·5 per cent. sulphuric acid for one hour at 100° C. provides a satisfactory method for the determination of cellulose in cereal straws. A comparison is made between the major constituents of the hydrolysed holocellulose and of Cross and Bevan cellulose. **C—9.**

Dinitrophenyl Amino Acid Derivatives: Chromatographic Separation. S. Blackburn. *Biochem. J.*, 1949, **45**, 579-584. The author describes the use of buffered silica-gel columns in the partition chromatographic separation of 2:4-dinitrophenyl amino acid derivatives obtained by reaction with 1:2:4-fluorodinitrobenzene. Band rates are given for the amino-acids in various solvent systems. **C—9.**

Lignin: Determination in Cereal Straws. G. A. Adams and A. E. Castagne. *Canadian J. Research*, 1949, **27**B, 915-923. The effect of sulphuric acid concentrations on the yield of lignin (assessed by methoxyl determinations) from extracted straws was investigated and for comparison the lignins were determined in the same straws by means of 42 per cent. hydrochloric acid. The effect of pre-treatment of the straw with dilute acid on the lignin yield was studied. It appears that extraction with 72 per cent. sulphuric acid, without pre-treatment, gives the highest yield of "lignin". **C—9.**

Long-chain Alkyl Sulphates: Colorimetric Determination. Fred Karush and Martin Sonenberg. *Anal. Chem.*, 1950, **22**, 175-177. A colorimetric procedure for the determination of long-chain alkyl sulphates depends on the formation of a complex between the detergent anion and rosaniline hydrochloride, the extraction of the complex into an organic phase, and the measurement of its spectral absorption with a Klett-Summerson colorimeter. Solutions as dilute as 5×10^{-6} M can be analysed with an accuracy of about 2 per cent. **C—9.**

Methoxyl and Uronic Acid Groups: Distribution in Cereal Straws. G. A. Adams and A. S. Castagne. *Canadian J. Research*, 1949, **27**B, 924-932. The distribution of methoxyl and uronic acid groups in wheat and oat straw has been investigated in the following successive fractions: extractive-free straw, pectin-free straw, holocellulose, hemicellulose "A", hemicellulose "B", and "α-cellulose" residue. The results are discussed. The molar ratio (uronic acid anhydride)/(methoxyl) was less than unity in the holocelluloses but greater than unity in the hemicelluloses. **C—9.**

Organic Compounds: Characterisation; Developments. R. L. Peck. *Anal. Chem.*, 1950, **22**, 121-126. A review is given of recent developments in the characterisation of organic compounds, including methods for determination of purity, physical examination, and chemical testing. There are 108 references to the literature. **C—9.**

Organic Compounds: Polarography; Developments. S. Wawzonek. *Anal. Chem.*, 1950, **22**, 30-33. A review is given of developments during 1949 in organic polarography as applied to reversible systems and such irreversible systems as aldehydes, ketones, organic acids, organic halides, nitro compounds,

unsaturated hydrocarbons, peroxides, sulphur compounds, and heterocyclic compounds. There are 58 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A175. **C—9.**

Organic Compound Functional Nitrogen-containing Groups: Determination. W. W. Becker. *Anal. Chem.*, 1950, **22**, 185-188. A review is given of methods for determining certain nitrogenous functional groups in organic compounds. Procedures are outlined for the determination of the nitrate, nitro, diazo, azo, amino, amide, alkimide, and nitrile groups. There are 44 references to the literature. **C—9.**

Organic Gravimetric Analysis: Developments. J. F. Flagg. *Anal. Chem.*, 1950, **22**, 96-97. A review is given of developments during 1949 in the gravimetric analysis of organic compounds. There are 20 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A174.) **C—9.**

Organic Nitrogen Compounds: Micro-Kjeldahl Analysis. ("Mikrogrammverfahren zur Bestimmung des organisch gebundenen Stickstoffes nach der Kjeldahlmethode.") E. Schulek and Gy Fóti. *Anal. Chim. Acta*, 1949, **3**, 665-673. A modified procedure is described for the microdetermination of nitrogen in organic compounds by the Kjeldahl method. The use of a receiver containing a known amount of strong acid can be omitted. The indicators recommended are: the sodium salt of alizarinsulphonic acid (up to 100 μg N) and methyl red (over 100 μg N). Titrations were carried out with 0·004 N and 0·002 N sulphuric acid respectively. Results obtained with proteins, quinine, papaverine, pyramidon, taurine, *etc.*, are satisfactory. **C—9.**

Organic Volumetric Analysis: Developments. W. T. Smith and R. L. Shriner. *Anal. Chem.*, 1950, **22**, 101-108. Work done during 1949 on volumetric methods for the analysis of organic compounds is reviewed. The methods cover determinations of various elements, certain functional groups, and the percentage of a compound as a component of a mixture. There are 117 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A174.) **C—9.**

Reducing Sugars: Colorimetric Determination with Triphenyltetrazolium Chloride. A. M. Mattson and C. O. Jensen. *Anal. Chem.*, 1950, **22**, 182-185. A colorimetric method for the determination of sugars depends on the reduction of triphenyltetrazolium chloride. It has been applied to the analysis of lactose in milk and of glucose and fructose in honey. **C—9.**

Reducing Sugars: Determination by Titration with the Sugar Solution. Jakob Blom and C. O. Rosted. *Acta Chem. Scand.*, 1947, **1**, 382-387. A rapid method is described for the determination of reducing sugars by titration with the sugar solution. A reaction mixture is chosen which gives the lowest hydrolytic and oxidative cleavage of glucoside bonds in oligo- and polysaccharides. The reaction mixture contains copper sulphate, KNa tartrate and K ferricyanide in a carbonate buffer and has a *pH* of about 10·4. The reduced copper is precipitated as almost white K cupro-ferrocyanide, which does not interfere with the observation of the decoloration of methylene blue indicator. **C—9.**

Cellulose III: Formation from Hydrazine-Cellulose. Keiroku Fuchino. *Bull. Inst. Phys. Chem. Res.* (Tokyo), 1941, **20**, 905-910 (through *Chem. Abstr.*, 1949, **43**, 8131[i]). Hydrazine-cellulose was prepared from natural ramie, and the cellulose was regenerated by evaporating or washing out the hydrazine with water, glycerol and ethanol at various temperatures. X-ray photographs of the cellulose regenerated showed that cellulose III is formed except in washing by water at below 100° C. When hydrazine-cellulose was prepared from hydrocellulose or mercerised cellulose, cellulose III was not formed by the same treatment. The mechanism of the formation of cellulose III appears to be the same as for cellulose IV. **C—9.**

Cellulose III: Reaction with Sodium Hydroxide; X-Ray Study. Masaya Tanaka and Keiroku Fuchino. *Bull. Inst. Phys. Chem. Res.* (Tokyo), 1941, **20**, 911-915 (through *Chem. Abstr.*, 1949, **43**, 8132[e]). In the action of caustic soda solutions of various concentrations on cellulose III, which was prepared from hydrazine-cellulose I, cellulose III reverted to cellulose I even in alkali solution which is too dilute for mercerisation. When the concentration of NaOH solution applied is high enough for mercerisation, cellulose III is transformed first into cellulose I and then mercerised to cellulose II. **C—9.**

Regenerated Cellulose: Recrystallization on Mercerisation. P. H. Hermans, D. Vermaas and A. Weidinger. *Nature*, 1950, **165**, 238. It is shown by the application of a quantitive X ray method[1] that different rayon fibres, on soaking in mercerising caustic soda solution at room temperature, undergo increase in crystallinity. ([1]*J. Textile Institute*, 1948, **39**, A397.) C—**9.**

Schardinger Dextrins: Acid Hydrolysis. (1) Karl Myrbäck and Torsten Järnström, (2) K. Myrbäck. *Ark v Kemi*, 1949, **1**, 129-143, 161-177 (through *Chem. Abstr.*, 1949, **43**, 6986[b], 7906[e]). (1) The Schardinger dextrin was prepared from starch and the enzyme of *Bacillus macerans*. Oxidation of the dextrin with K periodate in N sulphuric acid at room temperature used 1 atom of oxygen per mol. glucose in 76 hours. At 50° C. and in 0·1 N H_2SO_4 or at *pH* 3·5 the oxidation is more rapid (1 atom of oxygen per glucose unit in 2·5-3 hours). Thereafter the oxidation continues but is much slower. At *pH* 7·0, 12 atoms of oxygen per mol. glucose are used in the oxidation. The rate of hydrolysis of Schardinger dextrin in 0·5 N H_2SO_4 increases with time but remains fairly constant toward the end of the hydrolysis. This indicates that the ring is split at a slower rate than the straight-chain saccharides are hydrolysed. An attempt to correlate the concentrations of the hydrolysis products with a single hydrolysis constant was unsuccessful. (2) The course of hydrolysis of β-dextrins and the yield of the various products was calculated. Assumed values of three hydrolysis constants were used, and the results are compared with the determined values. The velocity of hydrolysis of the individual bonds of the ring of β-dextrin has a maximum value of 0·3 *k*, where *k* is the velocity of hydrolysis of an α-glucoside 1:4-bond of a long, open-chain saccharide. Maltose was assumed to be hydrolysed at 1·5 *k*. With these three constants, the calculated values of the concentrations of the hydrolysis products agreed well with those found following the acid hydrolysis of β-dextrin. C—**9.**

Starch and Glycogen: Hydrolysis with Hydrochloric Acid. Birger Carlqvist. *Acta Chem. Scand.*, 1948, **2**, 759-769. The hydrolysis of glycogen, starch, dextrin, and maltose with hydrochloric acid has been studied. Maltose is hydrolysed about twice as rapidly as glycogen under the same conditions. Different formulæ for hydrolysis of straight and branched chain molecules deduced by Sillén are discussed. C—**9.**

Proteins: Reduction and Structure. N. Troensegaard. *Acta Chem. Scand.*, 1947, **1**, 672-682. The results are given of an analytical investigation of the fractionation products from hydrogenated proteins. The proteins were dissolved in anhydrous solvents and reduced with metallic sodium in dry amyl alcohol. By the various cleavages which followed and by fractionisation a series of intermediate degradation products was obtained that cannot be obtained in acid hydrolysis. The globular proteins investigated consisted of a "compact" nucleus, "proteol", of uniform elementary composition and uniform acid combining capacity. The proteol is surrounded by systems of uniform elementary composition, containing diketopiperazine compounds in the case of gliadin and casein. In addition, there is a third peripheral system rich in nitrogen, which contains the hexone bases. C—**9.**

Ethers, Tertiary Amines, and Alkyl Halides: Hydrogen Bond Formation in Aqueous Solution. ("Studies of the Hydrogen Bond.") Lars Ehrenberg and Inga Fischer. *Acta Chem. Scand.*, 1948, **2**, 657-668; 669-677. (I) Experiments are reported on the systems diethyl ether-water and divinyl ether-water. Data from the measurement of solubility, partial molar volume, and dipole moment of water dissolved in the ethers and of surface and interfacial tensions are explained by the assumption that diethyl ether associates with water forming a binary complex, whereas divinyl ethyl does not. This is attributed to the different abilities of the two ethers in forming hydrogen bonds. (II) The solubilities of ethers, tertiary amines, and halides in water are discussed. Unsaturated or aromatic compounds, where the electron cloud of the hetero-atom is less polarizable, are less soluble in water. The association phenomena studied may be explained by the formation of hydrogen bonds, for which the availability of unshared electrons at the hetero-atom is important. There are 137 references to the literature. C—**9.**

Fatty Acids: Direct Optical Measurement of Molecular Length. J. S. Courtney-Pratt. *Nature*, 1950, **165**, 346-348. An illustrated description is given of an optical technique by which direct measurements have been made of the

thickness of monomolecular layers of adsorbed organic materials, *e.g.* stearic and octacosanoic acids on mica. The method involves the production of interference fringes. C—**9.**

Polymerisation Reactions in Liquid Ammonia: Mechanism. M. G. Evans, W. C. E. Higginson and N. S. Wooding. *Rec. Trav. Chim.*, 1949, **68**, 1069-1078. The polymerisation of styrene, methyl methacrylate and acrylonitrile is initiated by the amide ion in liquid ammonia, the product being a low molecular weight polymer containing one NH_2 group per polymer chain. Other negative ions, such as the triphenylmethyl anion, also initiate polymerisation. Certain disubstituted olefines such as α-methylstyrene and diphenylethylene do not undergo polymerisation but react with the amide ion forming intense red solutions. A mechanism for the polymerisation reaction is suggested, and the predicted dependance of molecular weight upon the concentration of potassium amide and of monomer (styrene) is in reasonable agreement with that observed in the concentration ranges studied in detail. The energetics of the initiation and termination reactions are discussed and the observed behaviour of various monomers with a series of different anions is semi-quantitatively explained. C—**9.**

Thermohardening Resins: Production, Properties and Applications. N. J. L. Megson. *Chemistry and Industry*, 1950, 100-104. A general account is given of methods of preparation, properties, and applications of thermohardening resins. Recent work on phenolic resins, silicones, and polyurethanes is discussed. C—**9.**

Adsorption: Review. B. L. Harris. *Ind. Eng. Chem.*, 1950, **42**, 20-24. Work done on adsorption during 1949 is reviewed under the headings: adsorption equations; surface area and particle size studies; porosity; chromatography; other liquid phase studies; general; and experimental developments. There are 208 references to the literature. C—**9.**

Casein: Adsorption and Bonding of Water. P. F. D'yachenko. *Colloid J. U.S.S.R.*, 1948, **10**, 199-202 (through *Chem. Abstr.*, 1949, **43**, 7787e). Adsorption of water from saturated vapour by casein and the integral heat of adsorption are not affected by treating casein with formaldehyde vapour, during which 25 mg. formaldehyde per g. were taken up. Formaldehyde little affects the integral heat of wetting by 0·1 N NaOH but lowers the integral heat of wetting by 0·1 N HCl. The amount of water "bound" by 1 g. casein was calculated from the negative adsorption of sucrose; it was 0·69 g. for air-dry casein, 0·39 for deaminated casein, 0·52 for casein flavianate, 0·55 for formaldehyde-casein, 0·44 for the flavianate of formaldehyde-casein, and 0·47 for casein dried at 105° C. C—**9.**

Dissolved Substances: Adsorption on Liquid Surfaces; Measurement by a Radioactive Method. Gunnar Aniansson and Ole Lamm. *Nature*, 1950, **165**, 357-358. A radioactive method is described for the measurement of the adsorption of dissolved substances on liquid surfaces. Isotopes emitting non-penetrating radiations are used. Results obtained by this method for sodium octodecyl sulphate ($C_{18}H_{37}SO_4Na$) labelled with sulphur-35 are in fair agreement with values calculated from surface tension measurements using the Gibbs adsorption equation. C—**9.**

Fatty Acids: Adsorption on Carbon Blacks; Calculation of Particle Size. H. A. Smith and R. B. Hurley. *J. Phys. & Colloid Chem.*, 1949, **53**, 1409-1416. When acetic acid was adsorbed by carbon black from cyclohexane as the solvent, the isotherm indicated that a unimolecular layer was readily formed on the carbon surface. Surface areas calculated on the assumption that the cross-section of the acid molecule in the adsorbed layer is 20·5 sq.A. are, in general, in agreement with the areas calculated by other methods. Results and adsorption curves are presented and experimental procedures briefly described. C—**9.**

Rough Surfaces: Wetting. ("Surface Roughness and Contact Angle.") R. N. Wenzel. *J. Phys. & Colloid Chem.*, 1949, **53**, 1466-67. Some remarks are made on the definition and determination of surface roughness and contact angle in connection with the fundamental theory of wetting action. No satisfactory general method of arriving at a numerical value for the roughness area ratio of a rough surface from analysis or profiles, taken at right angles

or in any other way, is readily apparent. Gas adsorption methods for the measurement of total area would appear to be the only applicable technique. C—**9.**

Elastic Viscous Oleate Systems Containing Potassium Chloride: Properties. H. G. Bungenberg de Jong and H. J. van der Berg. *Proc. Kon. Ned. Akad. v. Wet.*, 1950, **53**, 7-18. A device for exciting rotational oscillations is described that makes it possible to impart impulses of known different intensities. The influence of the intensity of the impulse on the events during the first and following periods has been investigated on oleate systems. Results confirm a supposition made previously[1] for explaining the constancy of n (the maximum number of observable oscillations). Particulars are given concerning the half periods between consecutive turning points before the damped oscillation has become isochronous. A simpler form of experimentation (in which the KCl concentration is kept constant) is discussed for the study of the action of organic substances on the elastic behaviour of oleate systems. It is shown by diagrams that maximum information can be obtained only if the KCl concentration corresponds to that of the minimum damping of the blank oleate system. A preliminary investigation has been made on the influence of hydrocarbons on the elastic behaviour of the 1·2 per cent. oleate system at the KCl concentration of minimum damping. The results indicate that tetrahydronaphthalene, toluene, benzene and cyclohexane aid KCl in building up the elastic system but that heptane and decahydronaphthalene counteract KCl. ([1] *J. Textile Institute*, 1949, **40**, A170; for other papers in this series see also *J. Textile Institute*, 1949, **40**, A417.) C—**9.**

Oleate Coacervates: Influence of Normal Alcohols. ("Influence of Organic Compounds on Soap and Phosphatide Coacervates."—X.) H. L. Booij, C. J. Vogelsang and J. C. Lycklama. *Proc. Kon. Ned. Akad. Wet.*, 1950, **53**, 59-69. The influence of normal alcohols, especially those of chain length in the region of 14 C-atoms, on the condensation of oleate coacervates has been investigated. The condensing action of the normal alcohols on an oleate coacervate shows a maximum at 14 C-atoms, which agrees very well with the minimum of opening activity of the fatty anions (15 C-atoms). This is explained by assuming that an alcohol with 14 C-atoms fits exactly in the orderly oleate micelles, thus giving a maximum contribution to the London-van der Waals forces between the carbon chains. This picture leads to the idea that coacervation is connected with a change of the oleate micelles from small flat micelles with rounded sides to very big flat micelles. Part of the fact that the activity in the homologous series of alcohols increases with the addition of a carbon atom can be explained by the unequal distribution of the alcohols between the micelles and the equilibrium liquid. The smallest alcohols are found in the equilibrium liquid; from octyl alcohol onwards the alcohols are taken up into the micelles totally. (For part IX, see *J. Textile Institute*, 1950, **41**, A162.) C—**9.**

Polymers: Estimation of Molecular Distribution by Use of Inequalities. ("Use of Inequalities in Polymer Research.") G. Herdan. *Research*, 1950, **3**, 35-41. The differences between molecular weight averages of polymers obtained by different methods of determination are interpreted in terms of inequalities, and the relationship between these inequalities and the degree of polydispersity is shown. This leads to identification of three empirical relations between such averages as three fundamental algebraic inequalities. It is shown how to calculate directly the standard deviation, and the higher characteristic parameters, of the distribution of molecular weights from a knowledge of averages of different order. Knowing the mean and standard deviations, the general outline of the distribution curve may be estimated by applying a certain statistical inequality. In order to obtain a "best fitting" curve to the distribution of macromolecules, without assumptions about the law governing such distributions, use is made of inequalities between certain parameters which characterise the polydisperse substance and those which would obtain from a normal distribution. Numerical illustrations are given for the methods developed. C—**9.**

Polyamide Anti-foaming Agents: Mono-layer Properties. ("Polyamide Antifoams." II.) A. L. Jacoby and C. E. Johnson. *J. Phys. & Colloid Chem.*, 1949, **53**, 1417-1426. The behaviour of the mono-layers of three polyamide anti-foaming agents has been studied, and the effect on the mono-layer of such

factors as *pH*, molecular configuration, and the presence of alkaline earth ions and tannic acid, is reported. The results are interpreted to explain some of the observed operating characteristics of the polyamide anti-foaming agents in terms of a recent theory of their action according to which hydrogen bonding in the mono-layer plays an important role. (For part I, see *J. Textile Institute*, 1948, **39**, A308.) C—**9.**

Hypochlorous Acid: Activity Constant; Variation of Acidity Constant with Ionic Strength. ("Studies on the Equilibria in the Bleach Liquor." Part I.) R. W. Asmussen and L. T. Muus. *Contrib. Danish Inst. Textile Res.*, 1946, No. 1, 3-24. A report is presented of an investigation of the activity constant of hypochlorous acid and the variation of the acidity constant with the ionic strength. Previous work (from 1904 to 1941) is reviewed. The preparation of the hypochlorous acid and the apparatus used are described. The activity constant of the acid has been determined by an electrometric titration method, details of which are given. Typical titration curves are presented, with complete tables of the respective readings. The derived activity constant of hypochlorous acid is $2{\cdot}8\times10^{-8}$ at 20° C. and $2{\cdot}2\times10^{-8}$ at 0·6° C., the standard error being $0{\cdot}3\times10^{-8}$. The dependence of the acidity constant on the ionic strength is in good agreement with the Debye-Hückel equation when sodium sulphate is added in order to obtain a well-defined ionic strength. The results obtained are independent of the titrations being performed in complete dark or in daylight. C—**9.**

Ion Exchange: Review. R. Kunin. *Ind. Eng. Chem.*, 1950, **42**, 65-70. Advances made in the field of ion exchange during 1949 are reviewed under the headings: reviews; theory of ion exchange; water softening; deionisation; separations and concentrations; analytical applications; catalysis; biological applications; and new exchangers. There are 187 references to the literature. C—**9.**

Long-chain Colloidal Electrolytes: Solubilisation. W. D. Harkins, Rose Mittelmann and M. L. Corrin. *J. Phys. & Colloid Chem.*, 1949, **53**, 1350-1361. Evidence is presented of the existence of four types of solubilisation by solutions of colloidal electrolytes: (1) solubility in the water, which, when micelles are present, cannot be determined; (2) solubilisation of non-polar substances in the non-polar interior of the micelle, *e.g.* hydrocarbon oils in soap solutions; (3) solubilisation of polar-non-polar molecules in a position similar to that of the soap molecules, and (4) adsorption at the surface of the micelle, *e.g.* some dyes in soap solutions. The effect of these types of solubilisation on the diameter of the micelle is discussed and the means by which evidence has been obtained (*e.g.* by X-ray scattering) are described. The evidence for solubilisation by adsorption is not extensive and rests upon very few facts. C—**9.**

Membranes: Diffusion and Permeability. B. J. Zwolinski, Henry Eyring and C. E. Reese. *J. Phys. & Colloid Chem.*, 1949, **53**, 1426-1453. A new theory has been developed for the diffusion and permeability of membranes by considering molecular migration as a series of molecular jumps from one equilibrium position to another governed by a rate constant. A simple method has been developed for deriving Fick's first and second laws by considering difference equations. The theory is applicable to the diffusion of electrolytes and non-electrolytes in homogeneous and heterogeneous membranes, either in the presence or absence of external forces such as electrical fields, concentration gradients, or activity gradients. The theory has been applied to the permeability data of water, aliphatic alcohols, ethers, and amides through animal and plant cells. An analysis of the mechanism of the permeation process is made on the basis of distribution coefficients and temperature coefficients. Free energies, heat energies, and entropies for permeation are calculated and discussed in terms of the nature of the membranes, and values for the diffusion constants of the non-electrolytes in the bulk membrane are calculated. C—**9.**

High-polymers under Depolymerisation: Viscosity and Rate Constant Equations. Eskil Hultin. *Acta Chem. Scand.*, 1949, **3**, 465-473 (through *Chem. Abstr.*, 1949, **43**, 7800[b]). For depolymerisation processes,

$$k = 2K_m c_{gm} M_0 [\mathrm{d}(1/\eta_{sp})/\mathrm{d}t],$$

where k is the rate constant, K_m the viscosity-molecular weight constant, c_{gm} the concentration of basic moles per litre, M_0 the basic molecular

weight, η_{sp} the specific viscosity, and t the time for which the viscosity measurement is valid. The degree of polymerisation is approximately $n = 2K_m c_{gm} M_0 (t / \eta_{sp})$. The theory is applied to the depolymerisation of cellulose in sulphuric acid. When the cellulose concentration and its degree of polymerisation are high, the experimental values do not agree with those calculated from the formulæ. C—**9.**

Linear High Polymers: Intrinsic Viscosity-Temperature Coefficient; Effect of Chain Length. L. H. Cragg and J. E. Simkins. *Canadian J. Research*, 1949, 27B, 961-971. Measurements of the intrinsic viscosities of three fractions of polystyrene, ranging in molecular weight from 160,000 to 1,350,000, have been made over a 40° C. range of temperature in a good solvent (toluene) and a poor one (toluene with 30 per cent. *n*-butanol). These, together with similar but less accurate measurements with five fractions of GR-S, show that solvent effects on intrinsic viscosity are strongly dependent on molecular weight for linear flexible polymers, and support the view that the differences in intrinsic viscosity of such a polymer in good or poor solvents are due primarily to differences in the looseness or tightness of coiling of its flexible molecules in solution. C—**9.**

Infra-red Spectroscopy: Developments. R. C. Gore. *Anal. Chem.*, 1950, **22**, 7-11. A review is given of work done on infra-red spectroscopy during 1949, including instrumentation, qualitative and quantitative analyses, and applications to the study of polymers. There are 274 references to the literature. C—**9.**

Light Absorption Spectrometry: Developments. M. G. Mellon. *Anal. Chem.*, 1950, **22**, 2-7. A review is given of work done during 1949 on light absorption spectrometry, including new reactions and reagents, the nature and formation of coloured complexes, instruments, the theory of measurement, and applications in chemical analysis and colour specification. There are 129 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A177.) C—**9.**

Ultra-violet Absorption Spectrophotometry: Developments. E. J. Rosenbaum. *Anal. Chem.*, 1950, **22**, 14-15. Work done on ultra-violet absorption spectrophotometry during 1949 is discussed. There are 22 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A177.) C—**9.**

Cellulose Acetate: Effects of X-Ray Irradiation. N. N. Winogradoff. *Nature*, 1950, **165**, 72. The effects of X-ray irradiation on samples of cellulose acetate have been investigated. The tensile strength of samples was decreased to less than half. X-ray diffraction photographs taken after irradiation of the samples for increasing periods of time showed a progressive diffuseness of the pattern. Minute fissures (seen in photomicrographs) were produced in the samples after 40 hours exposure to radiation. These results indicate that chemical and structural changes may occur in cellulose acetate during the long exposures required for X-ray diffraction patterns, and may influence the interpretation of the diagrams. C—**9.**

α-Glycols: Reaction with Periodates; Effect of Light. F. S. H. Head. *Nature*, 1950, **165**, 236-237. In the oxidation of cotton cellulose, β-methyl glucoside, and β-methyl cellobioside with a large excess of sodium metaperiodate the reaction did not terminate when consumption of periodate and production of formic acid had reached the limits set by the classical Malaprade reaction, unless the experiments were carried out in complete darkness. The disturbance of the normal reaction caused by irradiation seems to be most pronounced when the "dark reaction" is relatively slow, as it is in the oxidation of cellulose. The evidence points to far-reaching degradation during the photochemical reaction. C—**9.**

Ion-pair Complexes: Photochemical Radical Formation in Aqueous Solution. M. G. Evans and N. Uri. *J. Soc. Dyers & Col.*, 1949, **65**, 709-713. Atoms or free radicals (OH, Cl, F, N_3, *etc.*) are formed by irradiation of aqueous solutions of ion-pair complexes, *e.g.* $Fe^{2+}OH^-$, $Fe^{3+}Cl^-$. The radicals produced by electron transfer excitation can be detected by their ability to initiate the polymerisation of vinyl compounds. C—**9.**

Methyl Methacrylate: Polymerisation; Rate Coefficients. M. H. Mackay and W. H. Melville. *Trans. Faraday Soc.*, 1950, **46**, 63-78. In continuation of Part I[1] of this series some further experiments are described on the effect of benzoyl peroxide and benzoquinone on the liquid-phase photopolymerisation of methylmethacrylate and with the dark reaction which continues after the

photo-polymerisation has been terminated by cutting off the illumination. The benzoyl peroxide photosensitised polymerisation is similar in mechanism to the direct photoreaction. The photopolymerisation is retarded, not inhibited, by benzoquinone. The approximate absolute value of the coefficient for interaction of polymer radicals with benzoquinone molecules has been calculated from the rate coefficients derived in Part I. Some experiments on the dark reaction are described, which are consistent with the photo-production of a substance capable of thermal dissociation at room temperature to produce radicals. (*J. Textile Institute*, 1949, **40**, A353.) C—**9.**

Nuclear Radiations: Influence on Polymerisation. ("Contribution à l'étude des polymérisations amorcées par des rayonnements nucléaires.") A. Chapiro, Ch. Cousin, Y. Landler and M. Magat. *Rec. Trav. Chim.*, 1949, **68**, 1037-1068. An account is given of results obtained on the initiation of polymerisations by slow neutrons, by γ- and X-rays, and by electrons of great velocity. The rate of polymerisation induced by γ-rays varies greatly with the monomer, it is lowest for butadiene and styrene, higher for acrylonitrile and methyl methacrylate, and highest for vinyl acetate. Addition of small amounts of various organic compounds usually increases the rate of polymerisation. C—**9.**

Photo-sensitised Reactions in Solution: Mechanism. Joseph Weiss. *J. Soc. Dyers & Col.*, 1949, **65**, 719-722. Photo-sensitised reactions in solution generally proceed by mechanisms involving free radicals and radical ions. The initial step is the interaction between an electronically excited form of the light-absorbing molecule and a suitable acceptor molecule which must be present in the system. A number of different examples are discussed, particularly those where (i) the initial processes are identical with the elementary process of the quenching of the fluorescence of the light-absorbing molecule and where (ii) the light-absorbing molecule undergoes transition to a triplet state, which is capable of initiating the photo-sensitised reaction. C—**9.**

Polystyrene, Polythene, and Paraffin Wax: Effects of X-Ray Irradiation. N. N. Winogradoff. *Nature*, 1950, **165**, 123. The effects of X-ray irradiation on samples of polystyrene, polythene, and paraffin wax have been investigated. The X-ray diffraction patterns before and after prolonged irradiation showed no definite changes in any of the structures. The samples displayed a bluish-white luminescence in the X-ray beam and after prolonged irradiation the polythene and polystyrene samples were discoloured. Subsequent exposure of the samples to ultra-violet radiation produced luminescence of the X-ray irradiated patches in polythene and paraffin wax, but the irradiated patch in polystyrene appeared almost black. Thus prolonged exposure to X-rays produced strong absorption of ultra-violet radiation in polystyrene. C—**9.**

Starch: Photochemical Degradation. W. J. Whelan and Stanley Peat. *J. Soc. Dyers & Col.*, 1949, **65**, 748-757. The mechanism of the photochemical degradation of starch and its components has been investigated. In the presence of oxygen photo-oxidation occurs, followed by a light-sensitised hydrolysis and further oxidation, which results in the complete conversion of amylose to carbon dioxide, via formaldehyde and formic acid, which have been identified. The results of aerobic photo-decompositions of potato starch, potato amylopectin, maltose, glucose, and α-methyl glucoside provide additional support for this hypothesis. A second form of photo-degradation takes place in the absence of oxygen, and has been studied in an atmosphere of highly purified nitrogen. The final products, as yet unidentified, do not include those of the aerobic degradation, and are characterised by a marked resistance to subsequent photo-oxidation. C—**9.**

Colour-contrast Phase Microscopy. F. C. Grigg. *Nature*, 1950, **165**, 368-369. In a new method of phase-contrast microscopy, instead of blacking out the substage stop except for the annulus, cross, or line, this is replaced by an appropriate colour filter, and the portion which usually transmits the light is of another, contrasting colour. Several combinations of colour filters have been investigated. C—**9.**

Electric Discharge Laboratory Lamps. N. L. Harris. *Engineer*, 1950, **189**, 143-146. A brief illustrated discussion is given of various types of electric discharge lamps for laboratory use. Technical details are tabulated for sodium, cadmium, mercury, cadmium-mercury, and thallium lamps. The use of the thallium lamp in interferometry is indicated and reference is made to its appli-

cation to the examination of surface finish on ground and lapped surfaces (particularly the surfaces of slip gauges). An industrial interference microscope for this purpose is described and illustrated. The use of discharge lamps for the production of spectra is also mentioned. Other types of discharge tubes which are briefly described include the high-voltage capillary tube, the negative glow discharge lamp and the hydrogen discharge lamp. **C—9.**

Objective Tricolorimeters: Calibration. Bent Buchmann-Olsen. *Contrib. Danish Inst. Textile Res.*, 1948, No. 7, 3-11. A new method for the calibration of photo-electric tri-colorimeters is discussed. The fundamental calibration of such an instrument is first treated theoretically, and it is shown that the practical application of the procedure indicated would be lengthy and exacting. A simpler method is then described and its principles are derived mathematically. The experimental procedure and apparatus used are briefly described. Some results are compared with those obtained by spectro-photometry. The new method is fully applicable in practice. **C—9.**

Reed Vibrometer: Application in Analysis and Control of Vibration. General Electric Co. *Textile Mercury & Argus*, 1950, **122**, 228. Illustrations are given of a reed vibrometer having a steel strip that can be altered in effective length by means of a knob until its natural frequency coincides with that of the vibration under examination. A scale then indicates the fundamental frequency of vibration at the point in question. The vibrating structure or machine is explored by the instruments at various points. **C—9.**

Elastically Supported Beams: Mathematical Analysis. ("A General Solution for the Bending of Beams on an Elastic Foundation of Arbitrary Continuity.") M. Hetényi. *J. Applied Phys.*, 1950, **21**, 55-58. In the analysis of beams which are supported elastically along their entire length, it is usually assumed that the elastic support is provided either by a series of independent springs, or by a completely continuous elastic medium. In this paper a general procedure is presented from which solutions can be derived for the bending of beams on foundations, intermediate between the above two types, under any loading or end conditions. The method is illustrated by examples. **C—9.**

Stressed Linear Systems: Response Characteristics. Marcello Cini. *J. Applied Phys.*, 1950, **21**, 8-10. For a linear system, steady-state response to sinusoidal stress cannot have a unique dynamic modulus and phase shift, but these quantities must be related to rate of creep; in particular, they cannot be independent of external frequency. A proof is given that such a linear system is always equivalent to a visco-elastic system. Finally the discrepancy between the relations deduced and experimental results of various authors is indicated and discussed. **C—9.**

Conifer Tracheids: Cell-wall Organisation: Electron Microscopy. A. J. Hodge and A. B. Wardrop. *Nature*, 1950, **165**, 272-273. The micellar orientation has been established for the cellulose of the inner layer of the secondary wall of the tracheids of *Pseudotsuga taxifolia*. This was done by preparing "Formvar" replicas of gold-shadowed tangential longitudinal sections of the wood and examining them with the electron microscope. The fibrillar structure of the cellulose was studied further by disintegrating delignified sections in a Waring "Blendor" and examining them directly after shadowing with uranium. At high magnification the fibrils gave the impression of consisting of a series of small particles 50-100 A. in diameter, placed end to end. Two electron micrographs are reproduced. **C—9.**

Electron Microscopy: Developments. F. A. Hamm. *Anal. Chem.*, 1950, **22**, 26-30. Developments in electron microscopy during 1949 are reviewed under the headings: instruments, applications (metallurgical and biological), specimen preparation, and electron diffraction. There are 86 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A177.) **C—9.**

Electron Microscopy Specimens: Preparation by Spraying. R. C. Backus and R. C. Williams. *J. Applied Phys.*, 1950, **21**, 11-15. Developments in the use of spraying methods for the preparation of specimens for examination in the electron microscope are reviewed and two volatile diluents, containing electrolytes and adjusted to normal *pH*, are announced for use in forming the spray drops. With these (ammonium acetate and carbonate) it is unnecessary to wash the specimen after the droplet patterns have been formed on the specimen screens.

Several advantages and uses of this spray method are described and discussed. The construction and use of a spray gun are described. C—**9.**

Low-temperature Replicas: Application in Electron Microscopy. C. E. Hall. *J. Applied Phys.*, 1950, **21**, 61-62. A replica method has been tested which appears to be of value for the electron microscopy of aqueous substances while they are in the frozen state. The specimen on glass is supported in a vacuum chamber in contact with a copper block, which is pre-cooled to liquid-air temperature. It is then etched and shadowed with chromium and a supporting film of silicon or silica. Two micrographs which have been obtained by this method show a dilute aqueous suspension of silver halide particles and crystals of ice. The rate at which water will sublime from a specimen is discussed. C—**9.**

Surface Replica Preparation Medium. ("A Simple Replica Technique Suitable for the Study of Surface Structures.") D. J. Crisp and W. H. Thorpe. *Nature*, 1950, **165**, 273. A brief account is given of a replica technique developed for the study of insect hairs, but which may be of general applicability. The medium is a strong solution of glycerin in gelatin. This has the advantages of elasticity and low adhesion to organic structures. C—**9.**

Porous Materials: Sound Absorption. C. W. Kosten. *Appl. Sci. Research*, 1949, B1, 241-250. In analogy with Kirchoff's correction to the velocity of sound in wide tubes the correction for narrow tubes is considered, in which the flow is essentially of the Poiseuille type. The correction is of minor influence on the damping and sound velocity, but may be of great importance for the absorption coefficient of absorbing porous materials. Instead of the normal thermal conductivity an apparent conductivity has to be introduced which can be a few times smaller than the normal one. A striking consequence is that absorbing layers of reasonable porosity should show a minimum absorption even in extreme circumstances. (For Part I, see *J. Textile Institute*, 1949, **40**, A426.) C—**9.**

Ultrasonic Energy: Application in the Textile Industry. ("Ultrasonics Gets Green Light for Textile Industry.") W. E. Newell. *Textile World*, 1950, **100**, No. 1, 90-92, 192, 195. A new ceramic material overcomes the barriers which have hitherto restricted the use of ultrasonics to the laboratory scale. It operates on low voltages (115-230 volts) and can be made in many shapes. Some potential applications to textile processes are indicated; at present ultrasonic energy can only be used for reactions taking place in liquid media. It can be used to accelerate any action or reaction requiring time, heat or agitation. C—**9.**

Rubbers: Birefringence. D. W. Saunders. *Nature*, 1950, **165**, 360. Rubber has been vulcanised by a peroxide reaction so that it is free from all additions, such as sulphur. The birefringence of a thin strip of this rubber, elongated under a known load, was measured by means of crossed Nicol prisms and a Babinet compensator. The relation between the stress and the birefringence was linear and reversible up to strains of about 100 per cent., and the stress-optical coefficient was $2{\cdot}05 \times 10^{-10}$ cm.^{2}/dyne. This compares very well with the value obtained by extrapolating to zero combined-sulphur content the results of Thibodeau and McPherson. C—**9.**

Dissolved Thread Molecules: X-Ray Study. ("Röntgenuntersuchung gelöster Fadenmoleküle.") O. Kratky and G. Porod. *Rec. Trav. Chim.*, 1949, **68**, 1106-1122. In the X-ray scattering by thread molecules in solution, five typical regions can be distinguished: (i) the individual atoms; (ii) regularly repeating monomer groups; (iii) regions of the chains that are still mostly straight; (iv) larger regions of the chains which are already coiled; and (v) the whole chain molecule. This is established in a detailed mathematical discussion of the scattering. Measurements on polyvinyl bromide solutions and on solutions of cellulose nitrate are reported, and the experimental results seem to establish that the procedure yields a direct evalution of the shape of dissolved chain molecules. C—**9.**

Macromolecules in Concentrated Solutions: Scattering of Visible Light and X-Rays. Gerald Oster. *Rev. Trav. Chim.*, 1949, **68**, 1123-1136. The problem of X-ray scattering by macromolecules in solution is identical with that for visible light if the relative visible index of refraction of the particles is near unity. The theory of the angular distribution and decrease of transmission due

to scattering by independent particles of various shapes and sizes is outlined. For a system of non-independent particles, the interparticle interferences of the scattered wavelets must also be considered. The Zernike and Prins expression for spherically symmetric distributions is applied to a dilute system of hard spheres and to the Kirkwood idealised liquid of hard spheres. The role of repulsive forces is considered and the correlation between the angular distribution of scattering and the osmotic pressure of the system is indicated. An extension of the theory to non-spherically symmetric systems such as concentrated solutions of elongated particles is suggested. Applications are made to solutions of the rod-shaped tobacco mosaic virus. C—**9.**

Triethanolamine Laurate Aqueous Systems: X-Ray Diffraction. S. S. Marsden and J. W. McBain. *Nature*, 1950, **165**, 141-142. Results are reported and discussed of X-ray diffraction by the following aqueous systems of triethanolamine laurate: the isotropic solution, the medium-concentration liquid-crystalline phase (middle soap), and the high-concentration liquid-crystalline phase (soap boiler's "neat"). Bragg spacings for these phases are shown graphically. C—**9.**

X-Ray Absorption Analysis: Developments. H. A. Liebhafsky. *Anal. Chem.*, 1950, **22**, 15-16. Work done on X-ray absorption analysis during 1949 is reviewed under the headings: X-ray absorption spectrometry, X-ray absorptiometry with polychromatic beams, X-ray fluorescence, and safety. There are 13 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A178.) C—**9.**

X-Ray Diffraction Analysis: Developments. H. S. Kaufman and I. Fankuchen. *Anal. Chem.*, 1950, **22**, 16-18. Work done during 1949 on X-ray diffraction analysis is reviewed with respect to apparatus and techniques, and applications. There are 87 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A178.) C—**9.**

Analysis of Variance: Multiple Decision Procedure. Edward Paulson. *Ann. Math. Statistics*, 1949, **20**, 95-98. The author considers the applications of the analysis of variance to problems of the type where differences in yield of a number of varieties are being investigated. It is suggested that a more useful procedure than the classical test of the null hypothesis that the varieties do not differ would be to use a statistical rule or "decision function" to classify the varieties into a "superior" and an "inferior" group. A suitable rule is suggested. C—**9.**

Median Significance Tests. ("Some Significance Tests for the Median which are Valid under Very General Conditions.") J. E. Walsh. *Ann. Math. Statistics*, 1949, **20**, 64-81. Significance tests for the population median using order statistics are derived for samples consisting of items drawn from continuous symmetrical populations each with the same median. No two observations need come from the same population. The order statistic tests are easily computed and are almost as efficient as the Student *t*-test for small samples from a normal population. C—**9.**

Normal Population Data: Variance. ("The Variance of Proportions of Samples Falling Within a Fixed Interval for a Normal Population.") G. A. Baker. *Ann. Math. Statistics*, 1949, **20**, 123-124. The proportion of a normal population lying between two fixed limits can be estimated in two ways. The variances of the two estimates are derived and computed. C—**9.**

Particle Distribution: Extreme Value Problem. Benjamin Epstein. *Ann. Math. Statistics*, 1949, **20**, 99-103. The distribution of the *n*th smallest or largest particle in a randomly chosen unit area is considered for particles distributed at random, and having a specified size distribution. The distribution is found under two different rules for dealing with areas which contain no particles at all. The application of the result to fracture problems, and in particular to the dielectric breakdown of capacitors, is indicated. C—**9.**

Statistical Data: Proof of Consistency and Maximum Likelihood. ("The Likelihood Equation, Consistency and the Maxima of the Likelihood Function.") V. S. Huzurbazar. *Ann. Eugenics*, 1948, **14**, 185-200. Properties of solutions of the likelihood equation are discussed. In particular, the statement is examined that maximum-likelihood estimators are consistent. It is shown that for distributions admitting sufficient statistics the likelihood function of every sample of any size has a unique maximum, and that, when the

range is independent of the parameter, a consistent solution is unique. It is pointed out that, under general conditions, the proof a "maximum" follows that of "consistency". C—**9.**

Unequal Samples of Data: Median Test; Tabulation. J. Westenberg. *Proc. Kon. Ned. Akad. Wet.*, 1950, **53**, 77-82. A significance test developed previously (1948), and applicable to equal samples taken from continuous populations of any frequency distribution, is extended for the case of unequal samples. A graphical treatment is described briefly and an example of its use is given. C—**9.**

Variance of Estimates. G. R. Seth. *Ann. Math. Statistics*, 1949, **20**, 1-27. Results on the lower limit to the variance of unbiased estimates have been brought together. Some of them have been extended to sequential estimates and the others have been improved to some extent. A general method for generating a system of orthogonal polynomials with respect to a certain class of weight functions is obtained, together with a result on the conditions under which the class of unbiased estimates formed by all functions of an unbiased estimate consists of just one element. C—**9.**

Sorption of Acids by Wool. R. Donovan and P. Larose. *Canadian Journal of Research*, 1949, **27**, No. 12, 879-889, (Section B). A determination of the amount of acid sorbed by wool from solutions of sulphuric acid of four different strengths (0·0101 to 0·0505 molar) and containing varying amounts of sodium sulphate (not greater than 0·16 molar) showed that the salt had little effect on the quantity of acid sorbed. The results were examined in the light of the theories of (i) Peters and Speakman and (ii) Gilbert and Rideal. The former theory gave a satisfactory explanation of the results, while the latter did not. Data on the absorption of hydrochloric acid and of sulphuric acid by wool appear to fit the Langmuir adsorption isotherm equation. W—**9.**

Wool containing Polymer: Electron Microscopic Examination. E. H. Mercer. *J. Textile Institute*, 1949, **40**, T629-639. An electron microscopic examination of material obtained by the tryptic digestion of wool containing polymethacrylic acid shows the presence of both typically fibrous cortical cells of wool and also of the polymer. Optical and electron optical micrographs of the retted wool are shown. The polymer seems to be deposited during polymerisation chiefly in the extra-fibrillar regions (pores and matrix) of the fibres. Since these regions are stretched first the fibres are harder to stretch in acid and neutral solutions when the polymer is in a condensed and coherent form. In alkaline solutions the acid polymer ionises and the complex is more easily extensible. W—**9.**

PATENTS

Liquid Starch Preparation. J. S. Pecker. B.P.624,426 of 5/3/1946:8/6/1949. A stable liquid starch preparation is made by mixing starch and water, cooking for 3 minutes, cooling, adding pine oil, a bluing agent, salt and borax, stirring and straining. C.

Viscometer-controlled Plant. F. L. Smidth & Co. A/S. B.P.624,468 of 20/12/1946:9/6/1949 (Conv. 30/12/1941). The claim is for a viscometer for controlling plant of the type of a cement mixer. The viscometer has differential gearing in the drive to rotatable arms or the like immersed in the fluid. The intermediate member of the gear can change its angular position in accordance with the torque transmitted between the input and output members of the gears and in doing so changes the disposition of one or more condenser plates with respect to corresponding fixed condenser plates. The resultant capacity changes are used to provide a viscosity indication or to change the viscosity of the fluid. C.

10—ECONOMICS

British Cotton Industry: Output and Employment, November, 1949. ("Cotton Output and Employment.") *Board of Trade J.*, 1950, **158**, 124-125. Figures are given showing yarn and cloth production, employment and machine activity in the cotton industry during the months from January, 1949, through November, 1949. Comparative yearly figures are also presented for the years 1945-1948, inclusive. An increase in production in November was due to bigger production of the coarse and medium counts; new records have been set up. C—**10.**

Indian Cotton: Exports 1946-47. Indian Central Cotton Committee. *Statistical Leaflet No. 4. (14th Issue, 1946-47).* 1948, pp. 5. Exports of raw cotton by sea from the Indian Union are compiled for the season 1946-47. The cotton is classified by varieties and also by staple length for exports to Europe, the United Kingdom, Japan, China and the East. **C—10.**

Textile Wholesale Prices, December, 1949, and January, 1950. ("Wholesale Price Index Numbers.") *Board of Trade J.*, 1950, **158**, 70-71, 298-299. The index numbers for December, 1949, and January, 1950, are respectively: Cotton 356·1, 362·1; Wool 358·1, 389·0; Other textiles 179·8, 184·7; All articles 241·0, 244·5. The big increase in the wool index was caused by substantial increases in yarn prices. **C—10.**

Artificial Fibre: Production in the U.S.A. in 1949. ("Full Recovery in Rayon Demand Achieved in 1949.") H. L. Dalton. *Rayon and Synthetic Textiles*, 1950, **31**, No. 1, 28-29. A brief survey is made of the production and sale of artificial fibre yarns in America during 1949. Sales were just below 1000 million lb., a figure exceeded only in 1948. The production figures for the years 1940 to 1949, inclusive, are compared graphically. New developments are briefly mentioned. **C—10.**

British Cotton Industry: Output and Employment, 1949. *Board of Trade J.*, 1950, **158**, 344-345. Figures are presented for cotton yarn and cloth production and employment and machine activity for the years 1945-1949. Monthly figures are given for 1949. Production of the various types of single yarn and of cloth by the cotton industry during 1949 reached post-war records. **C—10.**

British Cotton Industry Prices and Profits. Sir R. W. Lacey. *Textile Weekly*, 1950, **45**, 604 608; *Textile Mercury & Argus*, 1950, **122**, 426-433. The writer discusses the problem of costing in relation to taxation and to fair allowances for machinery replacement in a period of rising prices and changing money values. **C—10.**

British Cotton Spinning Industry: Productivity. D. C. Shaw. *Manchester School of Economic and Social Studies*, 1950, **18**, No. 1, 14-30. A report is given of an enquiry of man-power and output in British spinning mills (excluding waste mills) for the weeks ending 6th May, 1939, and 8th November, 1947. The data were collected from 48 mule mills and 66 ring mills, and are used in calculations of operative-hours per unit of production ("OHP"). The following tables are provided: (1) Productivity in the mills covered by 281 replies to the questionnaires (total production, average counts, labour force and production per head), (2) Productivity in the mills covered by 186 replies (reduced to mills having comparable conditions at the two dates), (3) Production per operative-hour in 1947 as a percentage of 1939, allowing for the change in average counts, and (4) Distribution recorded in 178 replies in terms of "labour content" per operative hour. The data show that there was a general decline in output per operative-hour of about 5 per cent. between the two dates. Coupled with this there was a reduction in hours worked and an increase in the proportion of employees not engaged in production (*e.g.* welfare workers), so that the over-all decline in output per head was about 17 per cent. Moreover, the data reveal large differences in productivity between individual mills. The discussion ends with certain reservations on the interpretation of the data and some suggestions for improved management. **C—10.**

British Textile Exports and Imports, 1949. *Board of Trade J.*, 1950, **158**, 235-240. In a statistical survey of the volume of exports and imports for the United Kingdom in 1949, figures are given for cotton, woollen, and silk and rayon goods. The volume of textile exports as a whole fell steadily throughout the year, and apart from the first quarter failed to reach the 1938 level. The export volume index numbers for 1949 are: Cotton goods, 73; Woollen goods, 131; Silk and rayon, 222; Other textiles, 64; (1938 = 100). **C—10.**

Japanese Rayon Export Trade. *British Rayon & Silk J.*, 1949, **26**, December, 68-69. In a survey of the Japanese rayon export trade, the trends of this market are traced from 1930 to the first four months of 1949. Figures are presented showing the quantities of yarn and fabrics exported to various countries during 1936, 1937, and the first four months of 1949. Some observations are made regarding the future of the Japanese export trade. **C—10.**

Netherlands Textile Manufacturing Industry: Output. J. Greenroyd. *Textile Recorder*, 1950, **67**, January, 83-85. A brief survey of the Dutch textile industry is presented. The average size of the textile unit in Holland is larger than in Britain. Textile manufacture is the country's second largest export industry, the chief textile being cotton. Some figures are given comparing the exports and imports of raw cotton, cotton yarns and cotton fabrics for 1946, 1947, 1948 with those for 1938. Production is not back to the pre-war level and the labour situation is difficult. Facts and figures are also discussed for wool and rayon textiles. The rayon industry is expanding and now the Netherlands rank fourth among the rayon exporting countries. In general, whereas cotton spinning and cotton and linen weaving mills are working below pre-war production, the woollen and rayon industries have exceeded pre-war level. C—**10.**

Rayon: World Production and Consumption, 1949. *Silk & Rayon*, 1950, **24**, 36, 38, 40, 42. Figures are presented for the world rayon production and consumption during the 1948/49 period. A decline in output in the United States of both filament and staple was the outstanding feature of the year, but this was more than balanced by increases in other countries. A short statistical survey of the situation is included. C—**10.**

Textile Fabrics: Production Costing. ("What is the Cost?") H. M. Broadley. *Textile Weekly*, 1950, **45**, 346-352, 496-498. A report of a lecture on a system of costing based on an analysis into "standard", "actual" and "estimated" costs. A discussion is reported. C—**10.**

Textile Wholesale Prices: December 1949 and Year 1949. *Board of Trade J.*, 1950, **158**, 225-231. In a survey of the wholesale prices of raw materials during 1949, mention is made of cotton and other textiles. Annual index numbers for the years 1938-1949, inclusive, are presented. The index numbers for December 1949 are: Cotton, 356·1; Wool, 358·1; Other textiles, 179·8. The trend of the indices during the period December 1948 to December 1949 is shown graphically. Percentage changes during the year are listed. C—**10.**

Textile Workers in Egypt, Europe and the U.S.A.: Pay and Productivity. R. Gasche. *Egyptian Cotton Gazette*, 1949, No. 8, 7-18. A survey is presented of the pay and productivity of textile workers in Egypt, Europe and the U.S.A. Productivity is discussed in terms of P.M.H. and O.H.P., and results achieved by various mills by the application of work study methods are reported. Wages in the United Kingdom and Egypt are compared for carding, draw frames, speed frames, spinning and weaving. C—**10.**

Output per Operative in U.K. and U.S. Woollen and Worsted Industries Compared. H. Schofield. *Textile Recorder*, 1950, **67**, No. 804 (March), 78-79. Typical figures are given that compare the productivities of the U.S. and U.K. wool industries. These are based on linear yards of fabric produced per operative engaged in the whole industry. It is suggested that 85 per cent. of the difference between U.S. and U.K. productivities is due to (*a*) the higher proportion of automatic looms in U.S., (*b*) the large U.K. exports of tops and yarns that do not contribute to cloth production and are therefore not included in the productivity factor, (*c*) the yarns produced in U.K. for non-fabric uses (hosiery, carpets, *etc.*), also not in the productivity factor, and (*d*) the higher proportion of men engaged in the U.S. industry. It is suggested that the remaining 15 per cent. difference in productivity is due to the difference between mass production of a few lines in the U.S. and the U.K. concentration on exclusive fabrics, involving an immense variety of designs, weights and qualities. W—**10.**

The Flax Problem. *Linen Trade Circular*, 1950, **36**, No. 1, Jan. 7, 2. The three year subsidy plan for Northern Ireland flax shows promise of preventing any further reduction in acreage. The yields however, are much too low. The reason for the low yields obtained is the inferior quality of the seed being supplied. More should be done in Northern Ireland as regards importing other varieties or developing new strains. France is endeavouring, with considerable success, to put the flax growing, retting and scutching industry on a sound footing. This season she is planning to import seed from Holland, Belgium, Denmark, England and Canada. L—**10.**

Belgian Scutchers in France. *Linen Trade Circular*, 1950, **36**, No. 1, Jan. 7, 5. The fundamental causes of the flax market situation in Belgium are mainly

due to currency restrictions. French spinners have found difficulty in the past year in paying for Belgian flax. Imports of French straw into Belgium have dropped, so also have exports of Belgian scutched straw. Some of the Belgian scutchers are now transferring their mills to France, and a few are already established there (of 330 scutch mills in France, 35 are worked by Belgians). This should ensure the most profitable use of the French crop and regular supplies to the spinners. If a sufficient number of Belgian scutchers move into France, the scutch mills could deal with the whole French crop. The development of a new process of chemical retting is about to take place on a production basis. It is reported that this will enable retting, drying and scutching to be completed within an hour. **L—10.**

Textile Organisation and Production. A. E. Clifford. *Fibres, Fabrics and Cordage*, 1950, **17**, No. 1, 14-17. The development of factories is traced briefly from the days of the cottage industry up to the present, and the principles of scientific management are discussed. Forecasting of future business is now being attempted by many firms, who then plan to allocate the means of production. The importance of incentive, evaluation of work, the necessity for assessing the factors controlling the quality of the finished goods, and elimination of wastage due to faulty incoming materials, are stressed. Application of principles of works costing will give good results, and a personnel department can be of much assistance to production. Convenient lay-out of plant and efficient maintenance are most important. This article is the first of a series. **L—10.**

Swedish Flax Crop. *Linen Trade Circular*, 1950, **36**, No. 6, Feb. 11, 17. It is reported that the 1949 flax crop in Sweden has given a good yield of satisfactory quality fibre. **L—10.**

Costing and Management Control in Flax Spinning. S. A. G. Caldwell. *Text. Mfr.*, 1950, **76**, February, 63-65. The market has changed since the war years from a seller's market to a buyer's market. Exports can be assured only by using modern equipment and methods of production in conjunction with a sound costing system and efficient management control.. The cost of manufacture is dependent on the size and make-up of the production unit. The paper discusses the different methods of structure, relationship, and responsibility of technical management and control, also plant lay-out, machine performance and utilisation of labour. Costs may be considered under three headings—material costs, labour costs and overhead costs. A weekly analysis of production and cost provides a valuable check on performance and running expenses. It also provides a standard for various items of expenditure in relation to output. A typical production and cost sheet is included. **L—10.**

11—INDUSTRIAL WELFARE, INDUSTRIAL PSYCHOLOGY AND EDUCATION

Acrylonitrile: Physiology and Toxicology. R. H. Wilson and W. E. McCormick. *Industr. Med.*, 1949, **18**, 243-245 (through *Bull. Hyg.*, 1949, **24**, 876). The literature on the aetiology and toxicology of poisoning by acrylonitrile is reviewed, and the clinical manifestations, treatment and prophylaxis are discussed. The mode of action is not exactly known and clinical data are scanty. Mild jaundice, gastric symptoms, weakness, headache and respiratory oppression have been described in workmen handling the compound. Several treatments are suggested. For prevention, concentrations should not exceed 20 parts per million and skin contact should be avoided. As acrylonitrile is readily absorbed by rubber, rubber gloves may be dangerous. Determination of the thiocyanate level of the blood has been suggested as an index of overexposure. **C—11.**

Formaldehyde and its Compounds: Dermatitis Hazards. ("On Dermatitis Caused by Formaldehyde and its Compounds.") V. Pirilä and O. Kilpiö. *Ann. Med. Intern. Fenniae*, 1949, **38**, No. 1, 38-51 (through *Bull. Hyg.*, 1949, **24**, 876). Thirty cases of dermatitis (in other than textile callings) caused by formaldehyde or formaldehyde resins are described and the literature is reviewed. **C—11.**

American Textile Mills: Management and Cost Cutting. *Textile World*, 1949, **99**, No. 11, 103-125, etc. This series of articles gives examples of measures adopted in American mills to increase productivity and reduce costs. (1) *"Principal Capital Outlay is for Modernisation,"* by R. C. Scott, pp. 103-104,

238, 240, 242. Particulars are given of dollar expenditure on new plant and modernisation. The total for 1949 is given as $455,120,000. Taking 1926=100, the Index Numbers for machinery have risen from 83·7 in 1939 to 159·0 in 1949, and for new buildings from 99 to 196. (2) "*Mills spend Money to save on Operating Costs,*" 105-109, 242, 244, 246. Brief, illustrated notes are given on innovations by a large number of mills. (3) "*A Three-step Plan for Cutting Costs in Your Mill,*" by Auren Uris and John Kostemayer, pp. 110-111, 224, 226, 232, 234. A programme of meetings with (*a*) management staff, (*b*) departmental executives, and (*c*) operatives is discussed. (4) "*The Overseer's Role in Lowering Operating Costs,*" by E. H. Helliwell, pp. 112-113. Practical hints are given on cost analysis, ratio of indirect to direct labour, prevention of stoppages, elimination of processes, and job assignment. (5) "*Cotton Mills cut Costs at every Step,*" by P. M. Thomas, pp. 114, 115, 234, 236. Notes are given on the usefulness of fibre testing in cotton buying, the breakdown of jobs and task specialisation, the employment of maintenance men, and new ventilation of the weaving shed. (6) "*Half-hose Cost cut,*" by C. M. Bowden, pp. 116-119. Reductions in costs by as much as 20 per cent. are reported in half-hose knitting mills following work-study programmes. (7) "*Long Draft and Pneumafil are Worsted Cost-cutting Team,*" by Francois Cleyn, pp. 118-119. The advantages of high-drafting in the different systems of worsted spinning are stressed and the Pneumafil device is claimed to reduce end breakage by 25 per cent. (8) "*Twelve-point Program reduces Full-fashioned Costs,*" by H. B. Le Feaux, pp. 120-121. Twelve suggestions are made for reducing costs in knitting fully-fashioned stockings, including (*a*) the employment of a manicurist, (*b*) the use of plastic forms for turning nylon hose by the inspectors, and (*c*) by direct knitting of 15-den. nylon yarn, the yarn being made to run over felt saturated with the appropriate oil. (9) "*Steady Improvements spark Knitting Mill Cost Program,*" by E. D. White, pp. 122-123. Savings at the Rome Hosiery Mills in fuel (by the use of a gas-fired boiler), in the extraction time in the dyehouse, and in lubrication costs are described. (10) *Modern Equipment and Layout Answer to high Woollen Mill Costs,*" by Gustav Zellnik, pp. 124-125, 236, 238. Particulars are given of greatly increased productivity in two woollen mills and a carpet mill following re-equipment and redeployment of labour. **C—11.**

Productivity Indices: Application. L. H. C. Tippett. *Brit. Inst. of Management, Conference Series 9, July,* 1949, 34 pp. The paper gives a brief account of the meaning, usefulness and application of productivity indices. The discussion following this paper, which was delivered to a Sectional Meeting of the British Institute of Management in May, 1949, is fully reported. **C—11.**

Cone Winders: Time Study; Effect of "Machine Interference". Edward Packer. *Time Study Engineer,* 1949, **4**, 227-235 (through *Management Abstr.,* 1949, **2**, 304). The formulæ which have been developed to calculate the amount of time lost due to "machine interference" are based on the ratio of machine running time/attention time and the number of machines tested. They should also take into account the operator's work-load while the machine is running. A series of time studies should be taken varying the operator's work load. The following items should be recorded for each study: the spindle stopped time, the operator's working time on stopped spindles, including walking time to spindle, the relaxation time with normal work cycle, and a rating of the operator's performance. When establishing production standards interference may be expressed in minutes per unit of production, stopped time per running hour (not very satisfactory), or in the most widely applicable ratio of total spindle stopped time/operator's working time on stopped spindles. In multi-machine operations the amount of idle time in which the operator can relax will vary with the number of machines tended and if the desired percentage relaxation time is fixed, the standard load can be calculated. The interference factor at standard load is obtained on a graph, from the time study data obtained at the various work loads. To find the standard interference factor may present practical difficulties of measurement where, as in cone winding, the number of workheads is large. It will be helpful to observe a number of spindles only, but these must be typical. In cases where the operator patrols machine heads arranged in a straight line, spindles in the middle of the row will be patrolled twice at equal intervals during each cycle, while those at

the ends will be patrolled twice within a short time interval followed by a longer period without attention. In such cases the typical machine heads will be those one quarter of the way from each end. C—**11.**

American Textile Research Organisations: Function. ("Recent Results of Textile Research Institute and Textile Foundation Research.") J. H. Dillon. *Amer. Dyes. Rept.*, 1949, **38**, 934-942. An account is given of the organisation of research by the Textile Research Institute and the Textile Foundation in the United States. Research programmes and some recent results are considered, including the damage done to cotton in mechanical processing. C—**11.**

United States National Bureau of Standards: Organisation. *Instrument Practice*, 1950, **4**, 136-138. A brief account is presented of the functions, organisation and some of the work of the U.S. National Bureau of Standards. Photographs illustrate some aspects of the work carried out by the Bureau on the standardisation of weights and balances. C—**11.**

Textile Education and Research. ("Higher Technological Education and Research in Texiles.") W. E. Morton. *Fibres*, 1949, **10**, 433-735. A paper read to the Anglo-American Conference on Textile Education, Buxton, 1949. The author holds the view that for an ideal course of training the elements of science and social studies should be integrated with the study of textile technology. In view, however, of the relatively short period of time generally available for training, he prefers the more specialised line of approach after provision of a background of general textile technology. The value of post-graduate research for a period of at least one year is emphasised, and the need is pointed out for providing future mill executives with training which will enable them to make effective use of operational research. C—**11.**

American Textile Research Centre. ("Cluett, Peabody Encourages Research.") Cluett, Peabody and Co. Inc. *Textile Industries*, 1949, **113**, No. 12, 97-99. A brief illustrated account is presented of the work and organisation of a new centre for textile research set up by the Cluett, Peabody Co. of America. C—**11.**

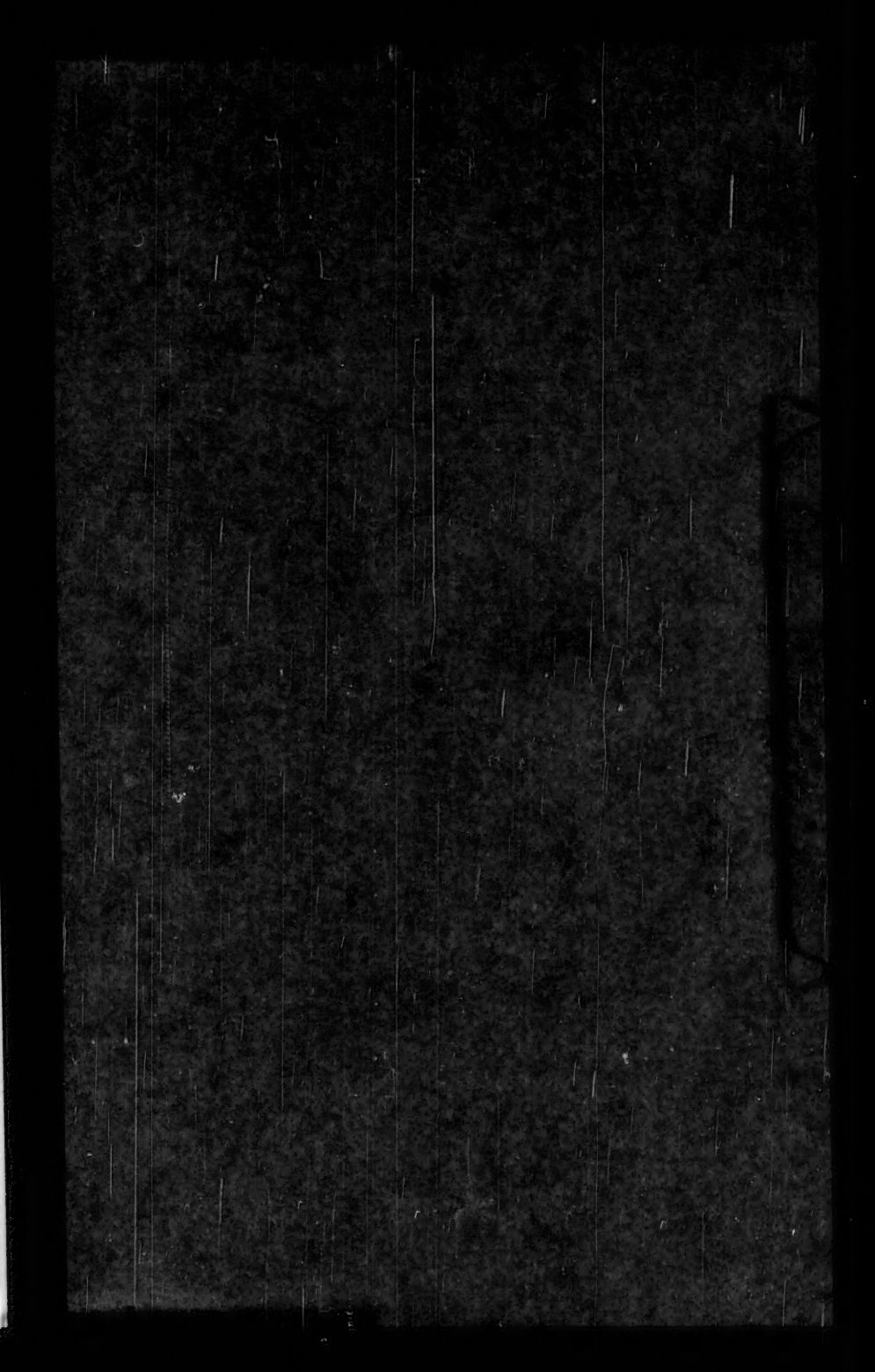
Philadelphia Textile Institute: Planning and Equipment. *Textile Industries*, 1949, **113**, No. 12, 107. A brief description is given of the new school for the training of textile students which has been built by the Philadelphia Textile Institute. A plan of the lay-out of the building is shown. C—**11.**

12—CONFERENCES AND EXHIBITIONS

Instruments for the Textile Industry. *Instrument Practice*, 1950, **4**, 139-140. A brief account is given of textile instruments demonstrated at the Textile Machinery Exhibition, Manchester, 1949, including various pick counters, production indicators, electronic cloth guiding equipment, a dye vat regulator and other control instruments. C—**12.**

Symposium on Photochemistry in Relation to Textiles. Society of Dyers and Colourists. *J. Soc. Dyers & Col.*, 1949, **65**, 585-588. A report of a conference and discussions held at Harrogate, 22nd-24th September, 1949. Abstracts of some of the 25 papers appear elsewhere in this and the next issue (Section 5 D). C—**12.**

American Association of Textile Chemists and Colourists: Annual Meeting. *Textile Industries*, 1949, **113**, No. 12, 108-115. Abstracts are presented of ten of the papers read at the national convention of the A.A.T.C.C. in October, 1949. C—**12.**

Electron Microscope Society of America: Annual Meeting. *J. Applied Phys.*, 1950, **21**, 66-72. Titles and abstracts of 49 papers presented at the annual meeting of the Electron Microscope Society of America, in October 1949, are reproduced. They include a paper (No. 17) by F. F. Morehead on the "Measurement of Cellulose Particle Length by the Electron Microscope." C—**12.**

Hosiery Refresher Conference. *Textile Manufacturer*, 1950, **76**, 37-39. A report is given of a two-day conference recently held at Leicester. Papers read are summarised under the headings: Textile testing; Dyeing theory and its practical significance; Colorimetry; *pH*—meaning and applications; Fundamentals of detergency, Dyeing, *etc.*, of hosiery; Hosiery finishing; and Fibres and fibre identification. C—**12.**